NAVSHIPS 91690(A)-1

SUPPLEMENT 1

to

INSTRUCTION BOOK

for

RADIO TRANSMITTING SET AN/FRT-15

covering

LOW IMPEDANCE ANTENNA KIT RM-193

and

H. V. INTERLOCK SWITCH KIT RM-194

RADIOMARINE CORPORATION OF AMERICA
75 VARICK STREET
NEW YORK 13, N. Y.

DEPARTMENT OE THE NAVY
BUREAU OF SHIPS

RADIOMARINE CORPORATION OF AMERICA
75 Varick Street, New York, N.Y.

DAG/as
8-54

MODIFICATION INSTRUCTIONS for RADIO TRANSMITTING SET AN/FRT-15 using RM-194 FIELD MODIFICATION KIT

1. PURPOSE:

The RM-194 is a Field Modification Kit for modifying the Radio Transmitting Set AN/FRT-15. It is used to provide additional protection for technical personnel and equipment from dangerous high voltage by shorting the dc side of the high voltage rectifiers to ground. This is performed automatically by plunger type HV shorting switches which are actuated when doors are opened or panels removed for servicing. The Modification Kit includes necessary switches, mounting brackets, interconnecting cables and hardware as listed on Radiomarine Drawing D-50196.

2. INSTALLATION PROCEDURE:

Step #1. Set MAIN LINE circuit breaker in OFF position. Discharge all filter capacitors using grounding rod.

Step #2. Mount one interlock switch in each of the positions shown on Dwg. D-50196. Use a No. 16 drill for mounting holes. Remove paint under all screw heads to provide good ground connections. Secure tightly all screws, flat washers, lockwashers and nuts.

Step #3. Drill mounting holes in doors to fit bumpers as shown in Details #2 and #3 of Dwg. D-50196.

RADIOMARINE CORPORATION OF AMERICA
75 Varick Street, New York, N.Y.

IAC/ma
8-54

MODIFICATION INSTRUCTIONS
for
RADIO TRANSMITTING SET
AN/PRT-1S
using
RM-194 FIELD MODIFICATION KIT

1. PURPOSE:

The RM-194 is a Field Modification Kit for modifying the Radio Transmitting Set AN/PRT-1S. It is used to provide additional protection for technical personnel and equipment from dangerous high voltage by shorting the de side of the high voltage rectifiers to ground. This is performed automatically by plunger type HV shorting switches which are actuated when doors are opened or panels removed for servicing. The Modification Kit includes necessary switches, mounting brackets, interconnecting cables and hardware as listed on Radiomarine Drawing D-50196.

2. INSTALLATION PROCEDURE:

Step #1. Set MAIN LINE circuit breaker in OFF position. Discharge all filter capacitors using grounding rod.

Step #2. Mount one interlock switch in each of the positions shown on Dwg. D-50196. Use a No. 16 drill for mounting holes. Remove paint under all screw heads to provide good ground connections. Secure tightly all screws, flat washers, lockwashers and nuts.

Step #3. Drill mounting holes in doors to fit bumpers as shown in Details #2 and #3 of Dwg. D-50196.

2. INSTALLATION PROCEDURE (con't)

Step #4. Drill and tap holes to install mounting cleats. See Section A-A and Section B-B of Drawing D-50196.

NOTE

The kit contains three mounting cleats for holding the various cables in place. One cleat is located inside the Radio Transmitting Group, another inside the Radio Modulator Group and the third inside the Power Supply Group at the top.

Step #5 Connect all interconnecting cables as shown in drawing D-50196.

NOTE

The High Voltage wire is used in the 4000 volt circuit. This wire is colored white with a red tracer. The red wire is used in the 500 volt circuit.

Step #6. All interconnection cables are terminated with terminal lugs except Item No. 18 on Dwg. D-50196. Solder the tinned end of this wire to terminal No. 34 on terminal board TB-3003.

Step #7. Install the three mounting cleats.

Step #8. Check installation with an Ohmmeter as follows:

(a) Push open both HV shorting switches located in the Radio Transmitter Group. See Section D-D.

(b) Measure the resistance between ground and terminal No. 34 of terminal board TB-3003. This reading should be approximately 7500 ohms.

B. INSTALLATION PROCEDURE (con't)

Step #4. Drill and tap holes to install mounting cleats.
See Section A-A and Section B-B of Drawing D-50196.

NOTE

The kit contains three mounting cleats for holding the various cables in place. One cleat is located inside the Radio Transmitting Group, another inside the Radio Modulator Group and the third inside the Power Supply Group at the top.

Step #5 Connect all interconnecting cables as shown in drawing D-50196.

NOTE

The High Voltage wire is used in the 4000 volt circuit. This wire is colored white with a red tracer. The red wire is used in the 500 volt circuit.

Step #6. All interconnection cables are terminated with terminal lugs except Item No. 18 on Dwg. D-50196. Solder the tinned end of this wire to terminal No. 34 on terminal board TB-3003.

Step #7. Install the three mounting cleats.

Step #8. Check installation with an Ohmmeter as follows:

(a) Push open both HV shorting switches located in the Radio Transmitter Group. See Section D-D.

(b) Measure the resistance between ground and terminal No. 34 of terminal board TB-3003. This reading should be approximately 7500 ohms.

2. INSTALLATION PROCEDURE. (con't)

(c) Release switches one at a time and check that Ohmmeter reads zero.

(d) Push open both HV shorting switches located in the Radio Modulator Group.

(e) Measure the resistance between ground and terminal No. 24 of terminal board TB-1502. This reading should be approximately 7000 ohms.

(f) Repeat part (c) above.

(g) Push open both shorting switches located inside the Power Supply Group at the top.

(h) Measure the resistance between ground and the bottom side of resistor R-2608. This reading should be approximately 83,000 ohms.

(i) Measure the resistance between ground and meter connection M-2702. This reading should be approximately 8000 ohms.

(j) Repeat part (c) above.

Step #9. Open all doors and remove rectifier shield panel. All shorting switches are now closed. With Ohmmeter check all connections for continuity.

This completes the installation of the RM-194 Field Modification Kit and the transmitter may now be put into operation as explained in the Instruction Book for Radio Transmitting Set AN/FRT-15. The interconnection diagram, page 3-11, 12, 13, and 14 should be corrected after the Radio Transmitting Set has been modified.

(c) Release switches one at a time and check that Ohmmeter reads zero.

(d) Push open both HV shorting switches located in the Radio Modulator Group.

(e) Measure the resistance between ground and terminal No. 24 of terminal board TB-1508. This reading should be approximately 7000 ohms.

(f) Repeat part (c) above.

(g) Push open both shorting switches located inside the Power Supply Group at the top.

(h) Measure the resistance between ground and the bottom side of resistor R-2608. This reading should be approximately 83,000 ohms.

(i) Measure the resistance between ground and meter connection M-2702. This reading should be approximately 8000 ohms.

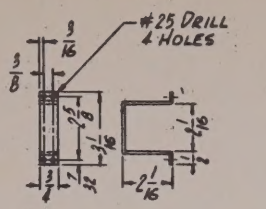
(j) Repeat part (c) above.

Step #3. Open all doors and remove rectifier shield panel. All shorting switches are now closed. With Ohmmeter check all connections for continuity.

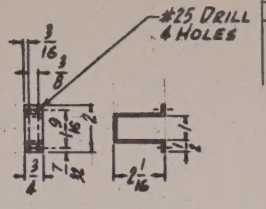
This completes the installation of the RM-194 Field Modification Kit and the transmitter may now be put into operation as explained in the Instruction Book for Radio Transmitting Set AN/PRT-15. The interconnection diagram, page 3-11, 12, 13, and 14 should be corrected after the Radio Transmitting Set has been modified.

D-50196

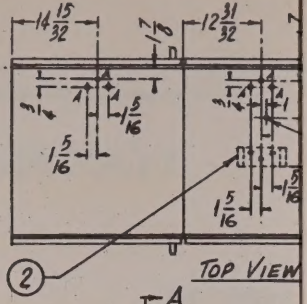
SUB NUMBERS
DATE 3-1-54 SUB. 0

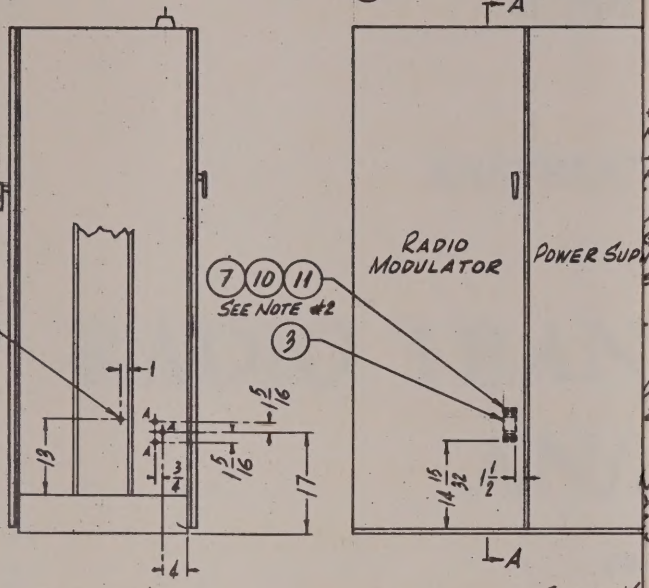


DETAIL #2



DETAIL #3





SECTION A-A

FRONT VI

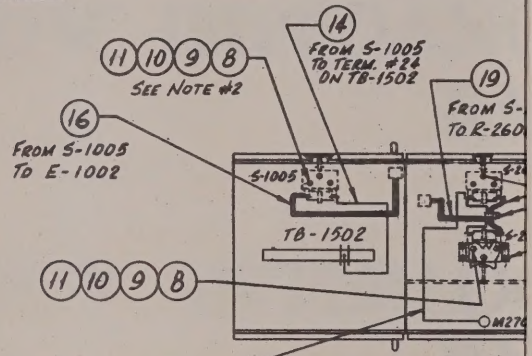
DETAIL #1, 3/32 C.R.S.
DETAILS #2 & #3, 1/16 C.R.S.

#3
ND BONDERIZE IN ACCORDANCE
I OF JAN-C-490
NC CHROMATE PRIMER IN
WITH JAN-P-735
ALKYD RESIN BASE GRAY ENAMEL
G TO TYPE C OF NAVY SPEC. 52E4
SELL COLOR RATING OF N-4.5
S RANGE OF 25 TO 40 UNITS

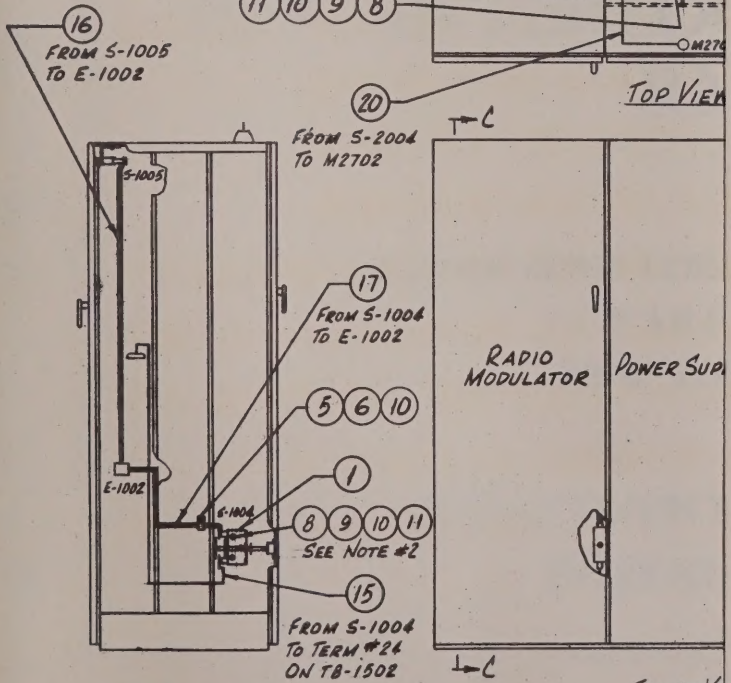
.0005 THICK IN ACCORDANCE WITH
QQ-P-416 & WATER DIP LACQUER

DRILLED TO FIT MOUNTING
2 & #3

VERMAN PROD. INC.,
Y. OR EQUAL
SCREW HEADS TO
ND CONNECTIONS



TOP VIEW



SECTION C-C

FRONT VI

ITEM NO.	DRAWING & PART NOS.	NO. REQ'D.	TITLE	REMARKS
21	B-31175-8	1	WIRE, #8	
20	B-31176-7	1	WIRE, #7	
19	B-31175-6	1	WIRE, #6	
18	B-31176-5	1	WIRE, #5	
17	B-31175-4	1	WIRE, #4	
16	B-31175-3	1	WIRE, #3	
15	B-31176-2	1	WIRE, #2	
14	B-31176-1	1	WIRE, #1	
13	B-31633	1	CABLE, "B"	
12	B-31605	1	CABLE, "A"	
11		35	NUT, 6/32 HEX.	N.P. BRASS
10		37	LOCKWASHER, #6 SPLIT	N.P. BRONZE
9		18	WASHER, FLAT	#6 × 3/16 O.D. × 1/32 THK. N.P. BRASS
8		18	SCREW, 6/32 × 7/16 LG.	NPBIND HBM
7		17	SCREW, 6/32 × 3/8 LG.	NPBIND HBM
6		2	SCREW, 6/32 × 1/4 LG.	NPRHBM
5		3	CLEAT, #3044-2	SEE NOTE #1
4		2	DETAIL #3	
3		1	DETAIL #2	
2		1	DETAIL #1	
1	TS-2166	6	SHORTING DEVICE	

KEY
A - #16 DRILL

RM-194
H.V. SHORTING DEVICE KIT
INSTALLATION

RADIOMARINE CORP. OF AMERICA
ENGINEERING DEPT. NEW YORK, N. Y.

DRAWN	CH'K'D	APP'D
M.K.	A.R.	BA
DATE 3-1-54	3-1-54	3-1-54

SCALE 1/16 = 1 D-50196

CALE THIS DRAWING
TOLERANCES UNLESS OTHERWISE SPECIFIED—
CTIONAL ± 1/64'; DECIMAL ± .005'; ANGULAR ± 1/4°

CO., NO. 272-1-52 1000

2. INSTALLATION PROCEDURE. (con't)

(c) Release switches one at a time and check that Ohmmeter reads zero.

(d) Push open both HV shorting switches located in the Radio Modulator Group.

(e) Measure the resistance between ground and terminal No. 24 of terminal board TB-1502. This reading should be approximately 7000 ohms.

(f) Repeat part (c) above.

(g) Push open both shorting switches located inside the Power Supply Group at the top.

(h) Measure the resistance between ground and the bottom side of resistor R-2608. This reading should be approximately 88,000 ohms.

(i) Measure the resistance between ground and meter connection M-2702. This reading should be approximately 8000 ohms.

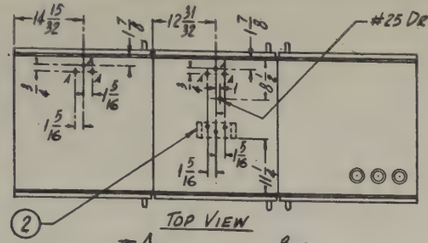
(j) Repeat part (c) above.

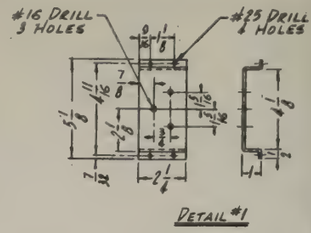
Step #3. Open all doors and remove rectifier shield panel. All shorting switches are now closed. With Ohmmeter check all connections for continuity.

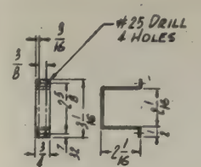
This completes the installation of the RM-194 Field Modification Kit and the transmitter may now be put into operation as explained in the Instruction Book for Radio Transmitting Set AN/FRT-15. The interconnection diagram, page 3-11, 12, 13, and 14 should be corrected after the Radio Transmitting Set has been modified.

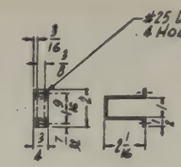
D-50196

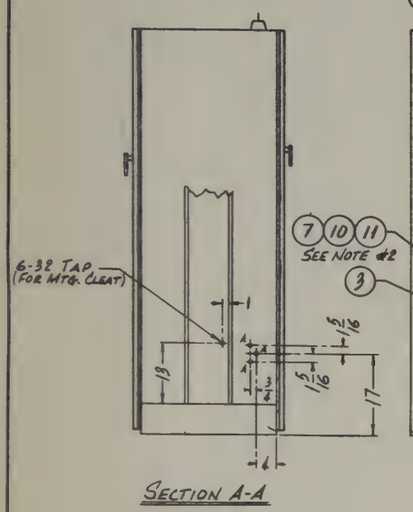
SUB NUMBERS
DATE 3-1-54 SUB. 0

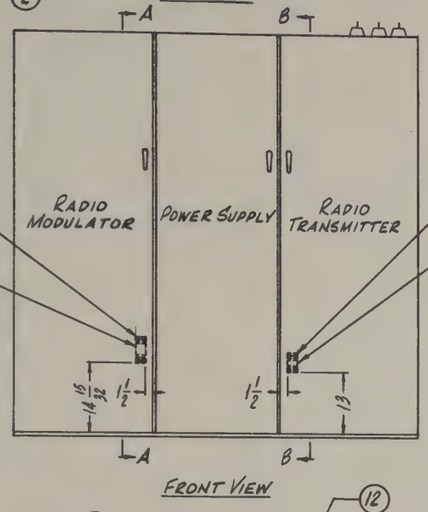


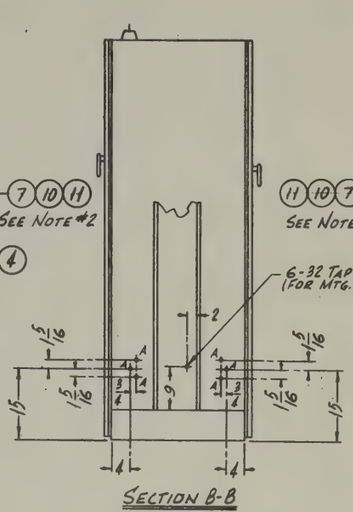


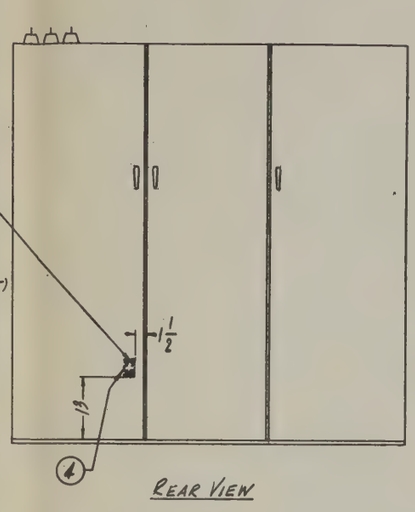












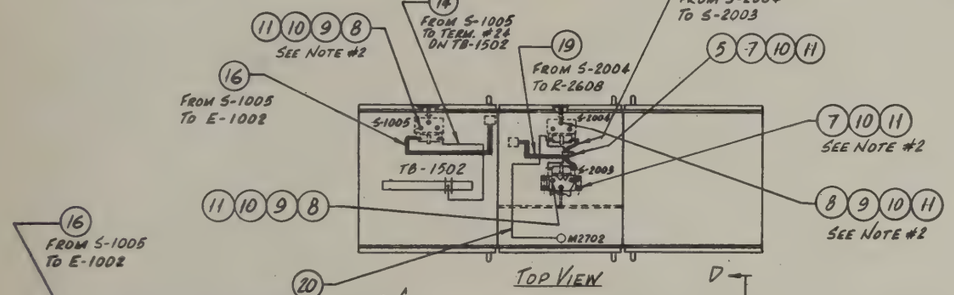
NOTE - MATERIAL FOR DETAIL #1, 3/32 C.R.S.
MATERIAL FOR DETAILS #2 & #3, 1/16 C.R.S.

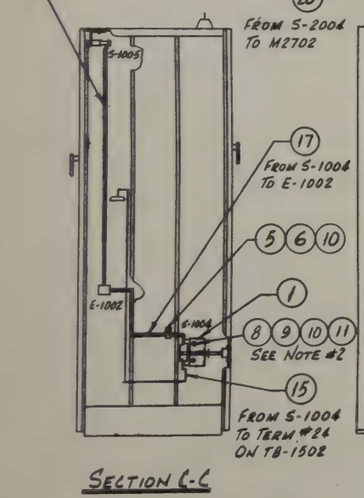
FINISH - FOR DETAILS #2 & #3
1 - DEGREASE AND BONDERIZE IN ACCORDANCE WITH GRADE I OF JAN-C-490
2 - ONE COAT ZINC CHROMATE PRIMER IN ACCORDANCE WITH JAN-P-735
3 - TWO COATS ALKYD RESIN BASE GRAY ENAMEL CONFORMING TO TYPE C OF NAVY SPEC. 52E4 WITH A MUNSELL COLOR RATING OF N-6.5 AND A GLOSS RANGE OF 25 TO 40 UNITS

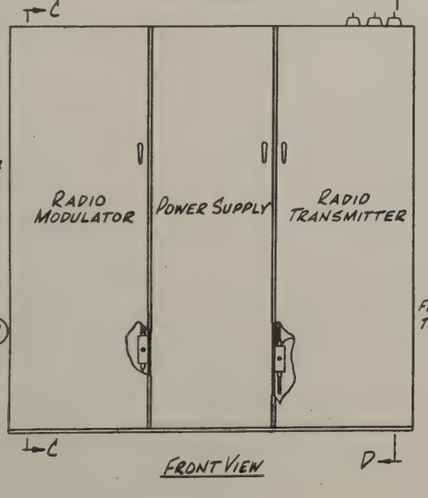
FINISH - FOR DETAIL #1
1 - CADMIUM PLATE .0005 THICK IN ACCORDANCE WITH FEDERAL SPEC. QQ-P-416 & WATER DIP LACQUER

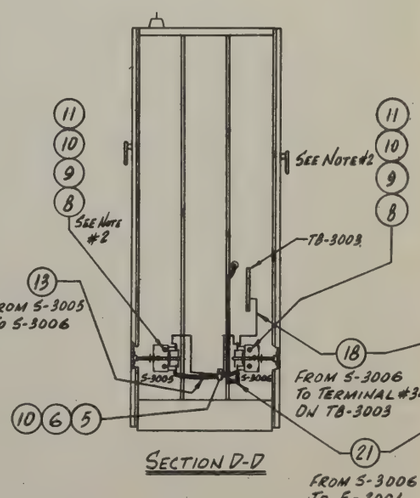
DOORS & CABINETS TO BE DRILLED TO FIT MOUNTING HOLES IN DETAILS #1, #2 & #3

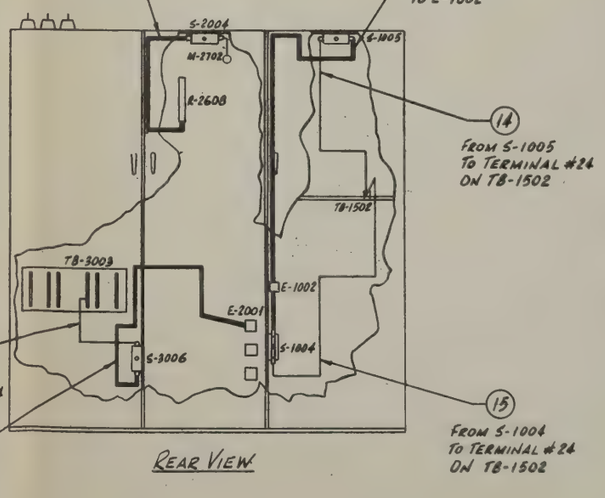
NOTES -
1 - AS SUPPLIED BY TINNERMAN PROD. INC., NEW ROCHELLE, N.Y. OR EQUAL
2 - REMOVE PAINT UNDER SCREW HEADS TO PROVIDE GOOD GROUND CONNECTIONS











ITEM NO.	DRAWING & PART NOS.	NO. REQ'D.	TITLE	REMARKS
21	B-31175-8	1	WIRE, #8	
20	B-31176-7	1	WIRE, #7	
19	B-31175-6	1	WIRE, #6	
18	B-31176-5	1	WIRE, #5	
17	B-31175-4	1	WIRE, #4	
16	B-31175-3	1	WIRE, #3	
15	B-31176-2	1	WIRE, #2	
14	B-31176-1	1	WIRE, #1	
13	B-31633	1	CABLE, "B"	
12	B-31605	1	CABLE, "A"	
11		35	NUT, 6/32 HEX.	N.P. BRASS
10		37	LOCKWASHER, #6 SPLIT	N.P. BRONZE
9		18	WASHER, FLAT	#6 - 3/16 O.D. - 1/32 THK. N.P. BRASS
8		18	SCREW, 6/32 x 7/16 LG.	NPBINDHBM
7		17	SCREW, 6/32 x 3/8 LG.	NPBINDHBM
6		2	SCREW, 6/32 x 1/4 LG.	NPRHBM
5		3	CLEAT, #3044-2	SEE NOTE #1
4		2	DETAIL #3	
3		1	DETAIL #2	
2		1	DETAIL #1	
1	TS-2166	6	SHORTING DEVICE	

KEY
A = #16 DRILL

DO NOT SCALE THIS DRAWING

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES UNLESS OTHERWISE SPECIFIED— FRACTIONAL ± 1/64'; DECIMAL ± .005'; ANGULAR ± 1/4°

RM-194
H.V. SHORTING DEVICE KIT INSTALLATION

RADIOMARINE CORP. OF AMERICA
ENGINEERING DEPT. NEW YORK, N.Y.

DRAWN	CH'KD	APPD.
M.K.	A.R.	B.A.
DATE 3-1-54	3-1-54	3-1-54

SCALE 1/16 = 1 D-50196

C. S. CO., INC. STD-1-50

NAVSHIPS 91690(A)-1

SUPPLEMENT 1

to

INSTRUCTION BOOK

for

RADIO TRANSMITTING SET AN/FRT-15

covering

LOW IMPEDANCE ANTENNA KIT RM-193

and

H. V. INTERLOCK SWITCH KIT RM-194

RADIOMARINE CORPORATION OF AMERICA
75 VARICK STREET
NEW YORK 13, N. Y.

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS

Contracts NObsr 64248
NObsr 71207

Approved by BuShips: 30 December 1954

LIST OF EFFECTIVE PAGES

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i to iii	Original	6-1	Original
1-0	Original	7-0 to 7-10	Original
2-1 to 2-3	Original	8-1 to 8-7	Original
3-0 to 3-4	Original		

DEPARTMENT OF THE NAVY
BUREAU OF SHIPS
WASHINGTON 25, D. C.

IN REPLY REFER TO
Code 993-100
30 December 1954

From: Chief, Bureau of Ships
To: All Activities Concerned with the Installation, Operation and Maintenance of the Subject Equipment

Subj: Supplement No. 1 to Instruction Book for Radio Transmitting Set AN.FRT-15 NAVSHIPS 91690(A)-1

1. This is supplement no. 1 to instruction book for the subject equipment and in effect upon receipt.

2. When superseded by a later edition, this publication shall be destroyed.

3. Extracts from this publication may be made to facilitate the preparation of other Department of Defense Publications.

4. All Navy requests for NAVSHIPS Electronics publications should be directed to the nearest District Publications and Printing Office. When changes or revised books are distributed, notice will be included in the Bureau of Ships Journal and in the Index of Bureau of Ships General and Electronics Publications, NAVSHIPS 250-020.

W. D. LEGGETT, JR.
Chief of Bureau

RECORD OF CORRECTIONS MADE

CHANGE NO.	DATE	SIGNATURE OF OFFICER MAKING CORRECTION

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SECTION 1
GENERAL DESCRIPTION

1. SCOPE OF SUPPLEMENT.

This supplement to the Instruction Book for Radio Transmitting Set AN/FRT-15 (NAVSHIPS 91690 (A)) contains descriptive material, modified theory of operation, and modified maintenance instructions for Radio Transmitting Set AN/FRT-15 after the installation of commercial Low Impedance Antenna Kit Radiomarine Type RM-193 and H. V. Interlock Switch Kit, Radiomarine Type RM-194.

References to the basic Instruction Book for Radio Transmitting Set AN/FRT-15 (NAVSHIPS 91690 (A)) are to Section and paragraph number, Figure number or Table number as applicable. Amended Figures and Tables have been given the same number as the corresponding material in the basic book except for an added "A" to indicate revision or addition of material.

2. PURPOSE AND BASIC PRINCIPLES.

Radio Transmitting Set AN/FRT-15, when modified by the installation of Low Impedance Antenna Kit RM-193 and H. V. Interlock Switch Kit RM-194 has the same purpose and use as the basic AN/FRT-15 equipment.

Installation of the Low Impedance Antenna Kit RM-193 converts the output connection of Radio Transmitting Set AN/FRT-15 from a balanced open-wire transmission line to an unbalanced 71 ohm coaxial transmission line.

Installation of the H. V. Interlock Switch Kit RM-194 provides additional protection for personnel and equipment from dangerous high voltages by shorting the dc side of the high voltage rectifiers to ground when the transmitter doors are opened or the rectifier protecting screen is removed.

3. REFERENCE DATA.

a. NOMENCLATURE.—Low impedance Antenna Kit, Radiomarine Type RM-193 and H. V. Interlock Switch Kit, Radiomarine Type RM-194, used with Radio Transmitting Set AN/FRT-15.

b. CONTRACT DATA.—Contract NObsr-64248 dated 23 June 1954.

c. CONTRACTOR.—Radiomarine Corporation of America, 75 Varick Street, New York 13, N. Y.

d. COGNIZANT NAVY INSPECTOR.—Inspector of Naval Material; New York, N. Y.

e. SHIPPING DATA.

(1) Number of Boxes.—RM-193—One
—RM-194—One

(2) Equipment Spares.—None

(3) Total Cubical Content.—RM-193—0.68 cu. ft.
—RM-194—0.68 cu. ft.

(4) Total Weight, Uncrated.—RM-193—3 pounds
—RM-194—4 pounds

4. ELECTRICAL CHARACTERISTICS.

a. The installation of the RM-193 and RM-194 kits affects only the output transmission line characteristic of Radio Transmitting Set AN/FRT-15. The output transmission line specified in Section 1, paragraph 3 *c* of NAVSHIPS 91690 (A) is now as follows:

OUTPUT TRANSMISSION LINE.—Unbalanced coaxial, 71 ohms impedance.

b. Information in Table 1-2 Equipment Required but not Supplied, is modified as follows:

(1) Delete material in REQUIRED CHARACTERISTICS column opposite, "Antenna and RF Transmission Line" and substitute "71 ohm coaxial line".

(2) Delete material in REQUIRED CHARACTERISTICS column opposite "Transmission line current meters" and insert "RF Ammeter - range 0 to 20 amps."

SECTION 2
THEORY OF OPERATION

1. GENERAL.

The installation of Low Impedance Antenna Kit RM-193 and H. V. Interlock Switch Kit RM-194 alters the theory of operation of Radio Transmitting Set AN/FRT-15 in only two respects, as follows:

a. The RF output of the transmitter is fed into a 71 ohm coaxial transmission line instead of an open wire transmission line of 70 to 800 ohms impedance.

b. The protection circuits for the high voltage dc rectifiers include grounding switches which operate when doors are opened.

2. RADIO FREQUENCY CIRCUITS.

The operation of the radio frequency circuits is identical to that given in NAVSHIPS 91690 (A) Section 2, paragraph 2 except that the last two paragraphs of 2*c* POWER AMPLIFIER AND OUTPUT CIRCUITS: CABINET-RADIO FREQUENCY AMPLIFIER CY-932/FRT-15 should now read as follows:

The output network is arranged for matching an unbalanced antenna of 71 ohms resistance and having a standing wave ratio not greater than 2 to 1. To provide this, the output tuning capacitor C-3985 is placed in series with a variable matching capacitor C-3001B having the rotor grounded, connected across the output coil. Capacitor C-3985 is driven by OUTPUT TUNING dial "L" and C-3001B is driven by OUTPUT MATCHING dial "N" through link mechanisms. OUTPUT MATCHING dial "K" operates switch S-3982 to connect various combinations of the four fixel vacuum capacitors C-3981 to C-3984 across the line to aid in matching at low line impedances. The output line is grounded to dc by resistor R-3002. Capacitor C-3001-A and resistor R-3001 are not used for this output connection.

The transmitter RF output is fed to a coaxial line terminated in a UG-154/U plug P-103 near the bottom of the Radio Transmitter Group OA-205/FRT-15 for connection of an unbalanced coaxial antenna transmission line.

Figure 2-9A, Power Amplifier and Output Network, Simplified Schematic shows this modification.

3. POWER CONTROL CIRCUITS.

The operation of the power control circuits is identical to that given in NAVSHIPS 91690 (A) Section 2, paragraph 7 except that the following should be added to subparagraph 7*b* (1) (d):

"In addition the dc sides of the 500 volt and 4000 volt rectifiers are shorted to ground by H. V. Interlock Switches S-201 (6 switches) when any of the cabinet doors (except OA-206/FRT-15 Power Supply Group front) is opened or the rectifier protection screen is removed."

Figure 2-17A, High Voltage and Airflow Interlock Circuits shows the interlock circuits as modified.

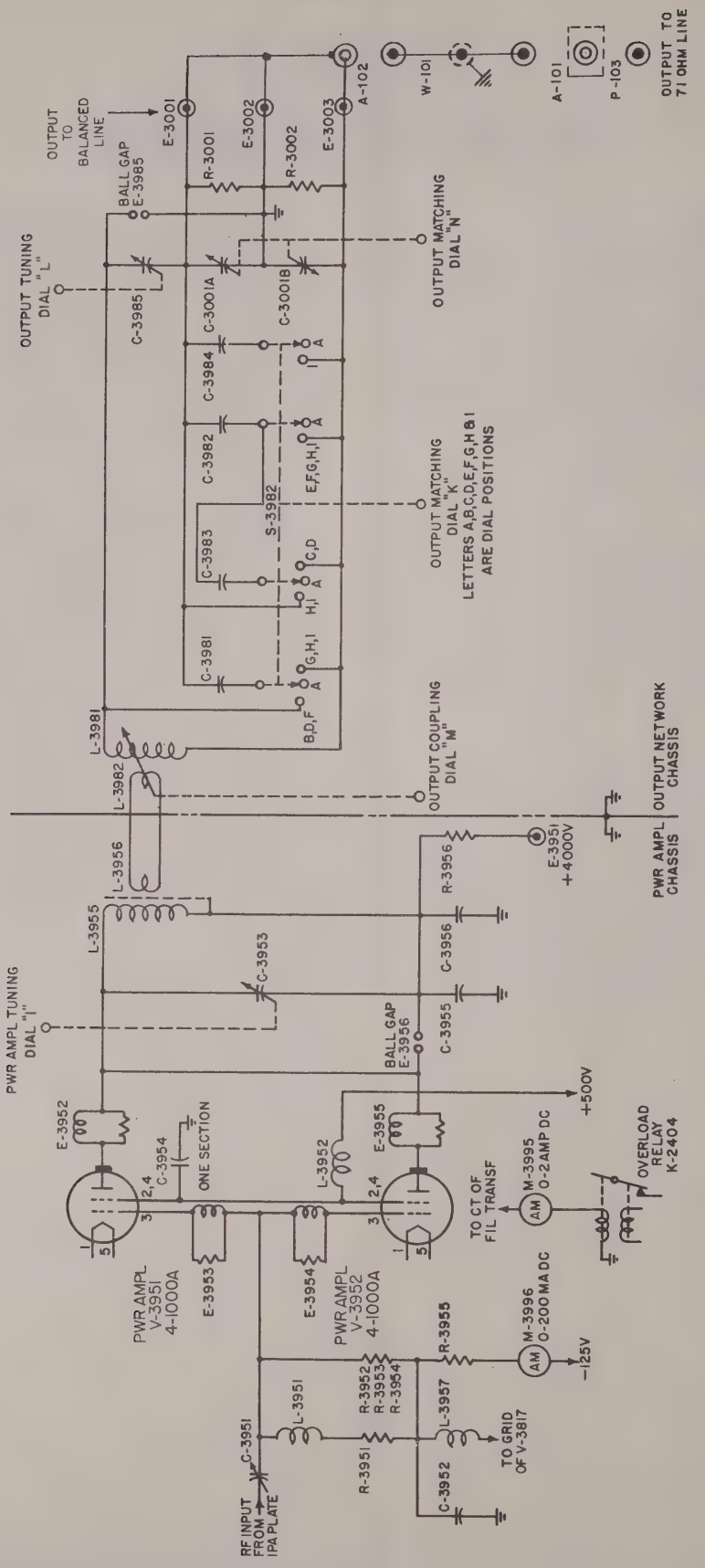


Figure 2-9A Power Amplifier and Output Network Simplified Schematic

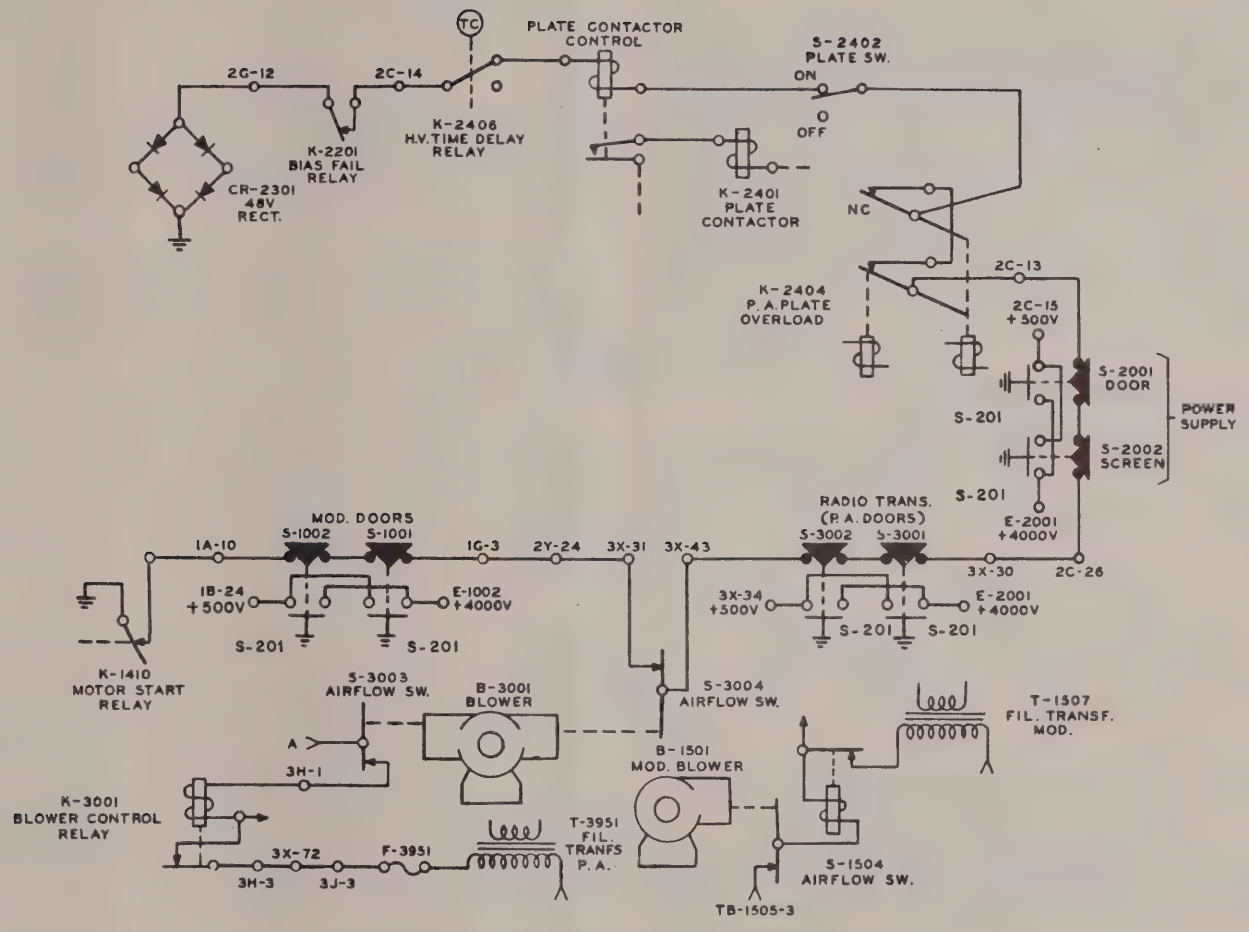


Figure 2-17A Voltage and Airflow Interlock Circuits

SECTION 3

INSTALLATION

1. GENERAL.

The installation of the RM-193 and RM-194 kits is covered in commercial instruction sheets packed with the kits.

Installation of the kits may be made either during or after the initial installation of Radio Transmitting Set AN/FRT-15 and the procedures given in the instruction sheets should be followed closely.

In order to insure that the Instruction Book NAVSHIPS 91690 (A) covers the complete installation as modified by the addition of the RM-193 and RM-194 kits certain parts of Section 3 require amendment. All installation procedures not specifically mentioned below remain the same.

2. ELECTRICAL CONNECTIONS.

a. EXTERNAL CABLES.—Paragraph 3*a*, Section 3 in NAVSHIPS 91690 (A) is changed to read as follows:

"Refer to Figure 3-3A for the conduit and wire sizes required for the power and control cables.

NOTE

All external connections including Coaxial Antenna RF Transmission line are brought through openings in the bottoms of the Cabinets".

Paragraph 3*a*(7) including sub-paragraphs (*a*) to (*f*) should be deleted and the following substituted:

"(7) ANTENNA TRANSMISSION LINE INSTALLATION.—The RM-193 Low Impedance Antenna Kit includes a UG-154/U plug, P-103 for connection to the 71 ohm coaxial cable (American Phenolic Co's Type 21-125 or equivalent) which is the unbalanced RF antenna transmission line. To install this cable;

(*a*) Attach the UG-154/U plug to the incoming end of the coaxial transmission line.

NOTE

Solder the small cable pin adaptor, supplied with the RM-193 kit, to the tip of the inner conductor of the cable, if required to make the cable fit the plug.

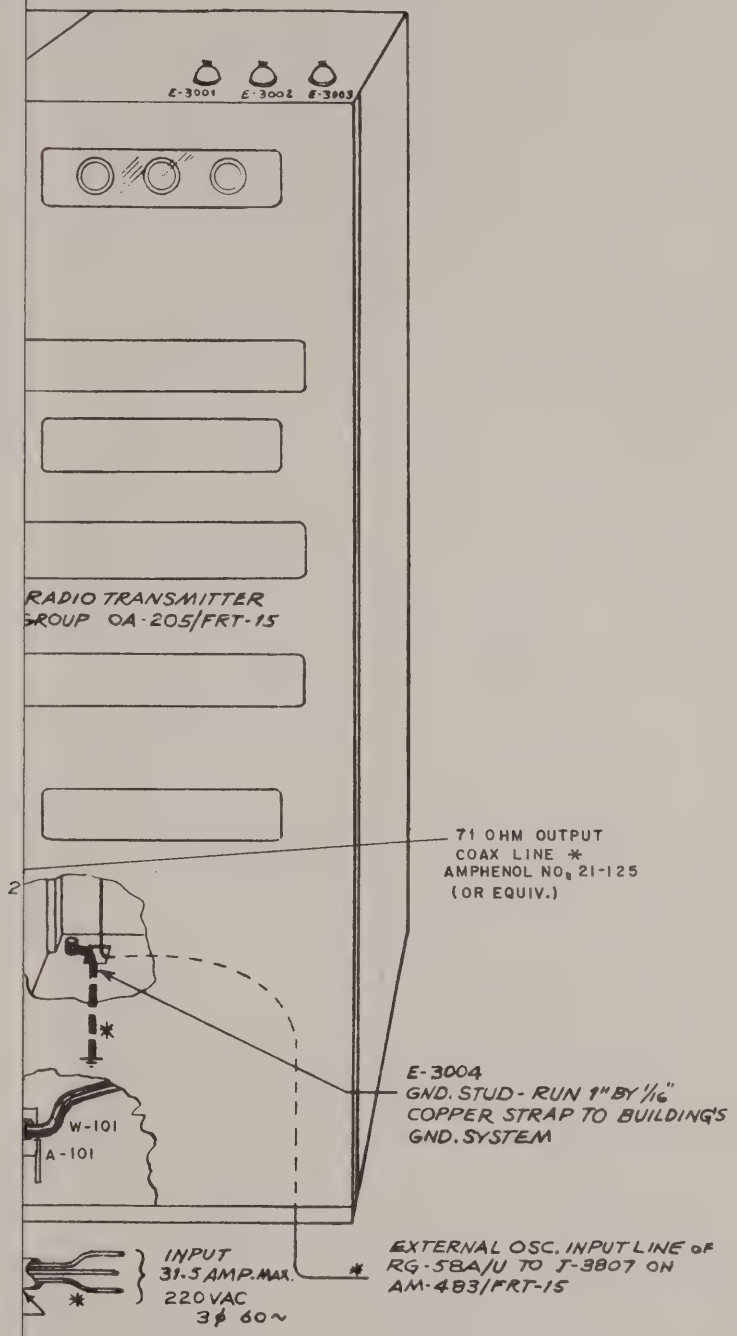
(*b*) Lead the end of the coaxial transmission line up through the four inch opening in the bottom of Cabinet CY-932/FRT-15 and connect it to the lower mounting bracket assembly A-101.

(*c*) If an antenna RF ammeter is used, install it as close to the lower mounting bracket A-101 as possible, connecting it to the "inner conductor" (pin connection) and use copper tubing, for connections. For the 71 ohm impedance line a 20 ampere RF ammeter is recommended."

b. INTERUNIT CABLING.

(Refer to Figure 3-6 in NAVSHIPS 91690 (A) and to Figure 3-7A in this supplement.)

Instructions for installation of interunit cables given in NAVSHIPS 91690 (A) apply in full to the modified transmitter. The additional interunit wires used in the H. V. Interlock Switch Kit RM-194 are installed in accordance with the instruction sheet furnished with the kit. These wires may be cabled up with the transmitter interunit cables or left loose in the interunit cable duct A-4201 as desired.



re 3-3A External Cabling for AN/FRT-15

SECTION 3

INSTALLATION

1. GENERAL.

The installation of the RM-193 and RM-194 kits is covered in commercial instruction sheets packed with the kits.

Installation of the kits may be made either during or after the initial installation of Radio Transmitting Set AN/FRT-15 and the procedures given in the instruction sheets should be followed closely.

In order to insure that the Instruction Book NAVSHIPS 91690 (A) covers the complete installation as modified by the addition of the RM-193 and RM-194 kits certain parts of Section 3 require amendment. All installation procedures not specifically mentioned below remain the same.

2. ELECTRICAL CONNECTIONS.

a. EXTERNAL CABLES.—Paragraph 3*a,* Section 3 in NAVSHIPS 91690 (A) is changed to read as follows:

"Refer to Figure 3-3A for the conduit and wire sizes required for the power and control cables.

NOTE

All external connections including Coaxial Antenna RF Transmission line are brought through openings in the bottoms of the Cabinets".

Paragraph 3*a*(7) including sub-paragraphs (*a*) to (*f*) should be deleted and the following substituted:

"(7) ANTENNA TRANSMISSION LINE INSTALLATION.—The RM-193 Low Impedance Antenna Kit includes a UG-154/U plug, P-103 for connection to the 71 ohm coaxial cable (American Phenolic Co's Type 21-125 or equivalent) which is the unbalanced RF antenna transmission line. To install this cable;

(*a*) Attach the UG-154/U plug to the incoming end of the coaxial transmission line.

NOTE

Solder the small cable pin adaptor, supplied with the RM-193 kit, to the tip of the inner conductor of the cable, if required to make the cable fit the plug.

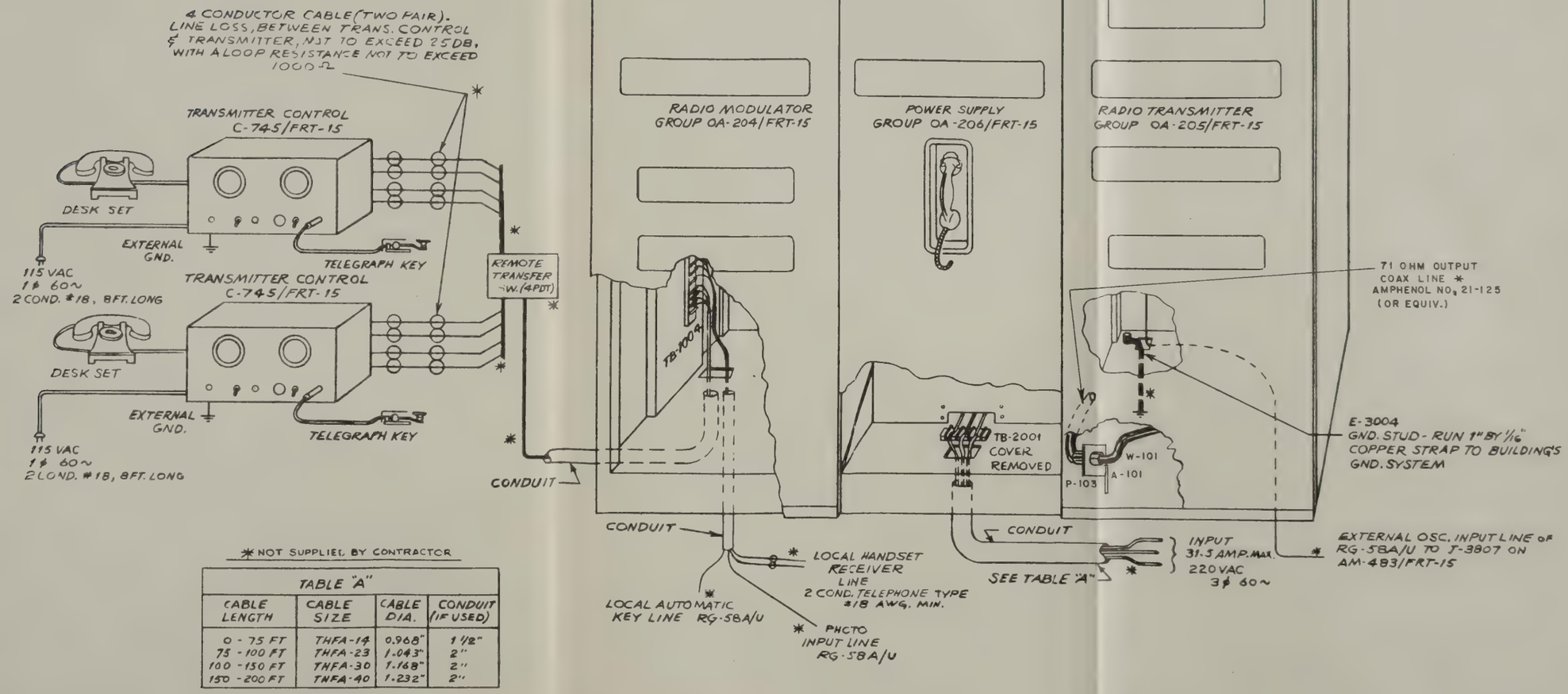
(*b*) Lead the end of the coaxial transmission line up through the four inch opening in the bottom of Cabinet CY-932/FRT-15 and connect it to the lower mounting bracket assembly A-101.

(*c*) If an antenna RF ammeter is used, install it as close to the lower mounting bracket A-101 as possible, connecting it to the "inner conductor" (pin connection) and use copper tubing, for connections. For the 71 ohm impedance line a 20 ampere RF ammeter is recommended."

b. INTERUNIT CABLING.

(Refer to Figure 3-6 in NAVSHIPS 91690 (A) and to Figure 3-7A in this supplement.)

Instructions for installation of interunit cables given in NAVSHIPS 91690 (A) apply in full to the modified transmitter. The additional interunit wires used in the H. V. Interlock Switch Kit RM-194 are installed in accordance with the instruction sheet furnished with the kit. These wires may be cabled up with the transmitter interunit cables or left loose in the interunit cable duct A-4201 as desired.


4 CONDUCTOR CABLE (TWO PAIR). LINE LOSS, BETWEEN TRANS. CONTROL & TRANSMITTER, NOT TO EXCEED 25DB, WITH A LOOP RESISTANCE NOT TO EXCEED 1000Ω
TRANSMITTER CONTROL C-745/FRT-15
DESK SET
EXTERNAL GND.
TELEGRAPH KEY
115 VAC 1φ 60~ 2 COND. #18, 8FT. LONG
TRANSMITTER CONTROL C-745/FRT-15
DESK SET
EXTERNAL GND.
TELEGRAPH KEY
115 VAC 1φ 60~ 2 COND. #18, 8FT. LONG
REMOTE TRANSFER SW. (4PDT)
CONDUIT
E-3001
E-3002
E-3003
RADIO MODULATOR GROUP OA-204/FRT-15
POWER SUPPLY GROUP OA-206/FRT-15
RADIO TRANSMITTER GROUP OA-205/FRT-15
TB-1004
TB-2001 COVER REMOVED
W-101
A-101
P-103
71 OHM OUTPUT COAX LINE * AMPHENOL NO. 21-125 (OR EQUIV.)
E-3004 GND. STUD - RUN 1" BY 1/16" COPPER STRAP TO BUILDING'S GND. SYSTEM
CONDUIT
CONDUIT
LOCAL HANDSET RECEIVER LINE 2 COND. TELEPHONE TYPE #18 AWG. MIN.
LOCAL AUTOMATIC KEY LINE RG-58A/U
PHOTO INPUT LINE RG-58A/U
SEE TABLE "A"
INPUT 31.5 AMP. MAX. 220 VAC 3φ 60~
EXTERNAL OSC. INPUT LINE OF RG-58A/U TO J-3807 ON AM-483/FRT-15

*NOT SUPPLIED BY CONTRACTOR

TABLE "A"

CABLE LENGTH	CABLE SIZE	CABLE DIA.	CONDUIT (IF USED)
0 - 75 FT	THFA-19	0.968"	1 1/2"
75 - 100 FT	THFA-23	1.043"	2"
100 - 150 FT	THFA-30	1.168"	2"
150 - 200 FT	THFA-40	1.232"	2"

Figure 3-3A External Cabling for AN/FRT-15

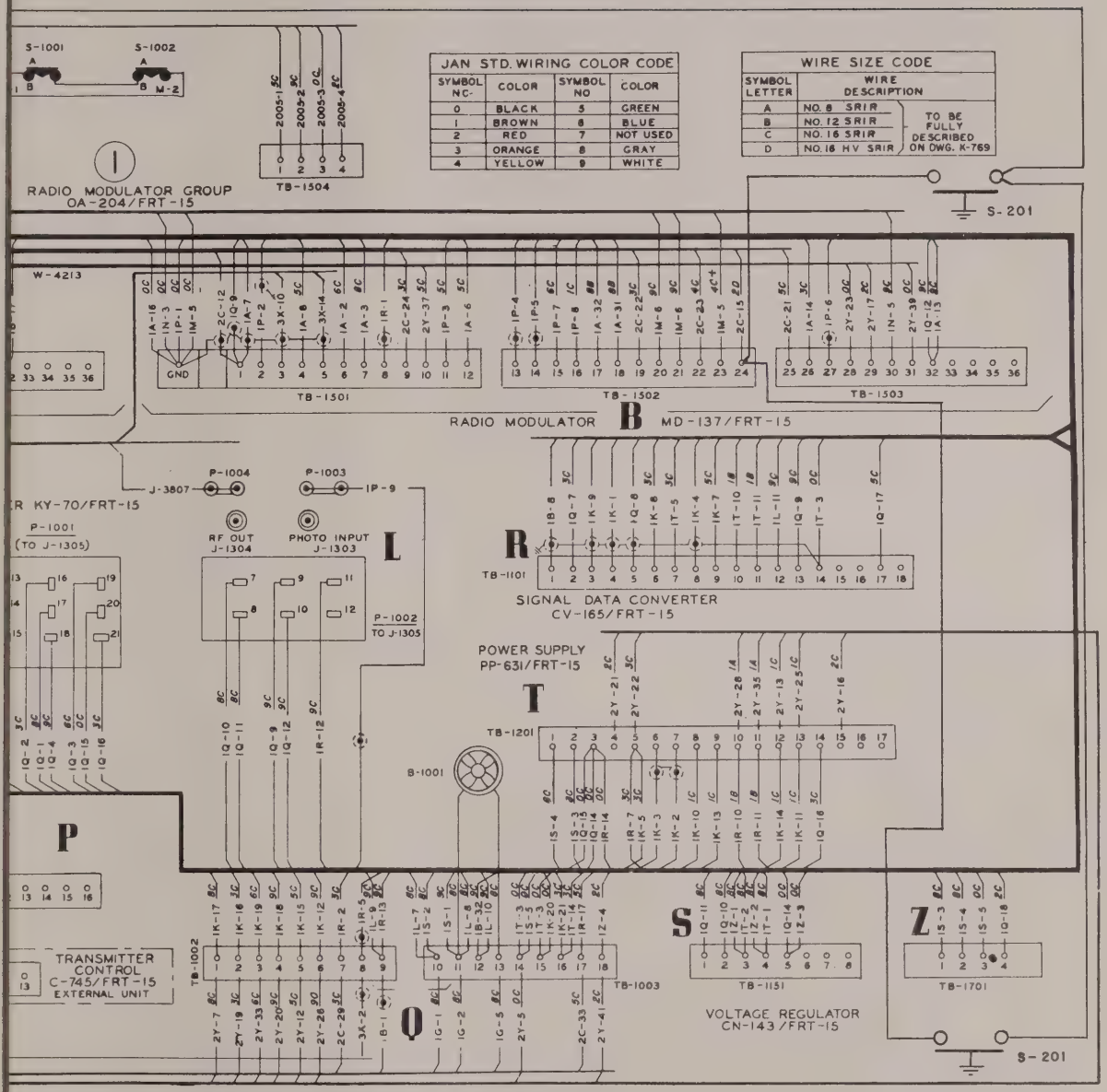


Figure 3-7A Radio Transmitting Set AN/FRT-15, Interconnection Diagram

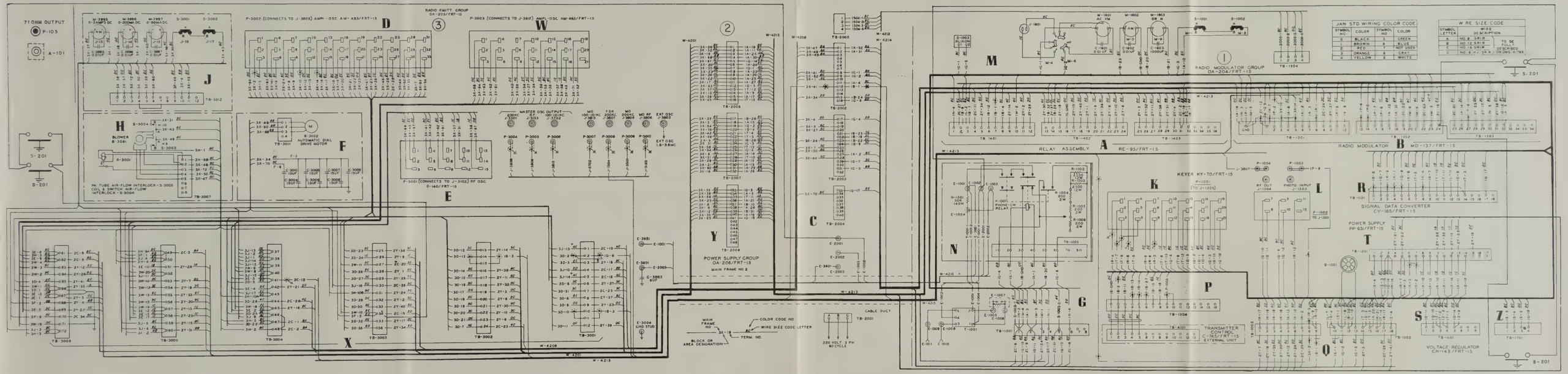


Figure 3-7A Radio Transmitting Set AN/FRT-15, Interconnection Diagram

SECTION 4

OPERATION

1. GENERAL.

The operating procedures and information given in Section 4 of NAVSHIPS 91690 (A) apply with the AN/FRT-15 equipment modified.

When tuning the transmitter in accordance with Paragraph *6b*, use the method for output matching as given for an unbalanced transmission line. To obtain approximate dial readings for dial "N" consult the "70 ohm" curves in Figures 4-8 and 4-9, Approximate Output Matching.

SECTION 5

OPERATOR'S MAINTENANCE

1. GENERAL.

All operator's maintenance information and procedures given in Section 5 of NAVSHIPS 91690 (A) apply in full to the AN/FRT-15 equipment as modified.

SECTION 6

PREVENTIVE MAINTENANCE

1. GENERAL.

All preventive maintenance information given in Section 6 of NAVSHIPS 91690 (A) apply in full to the AN/FRT-15 equipment as modified.

When making a preventive maintenance check of the plug connections be sure to include a check of antenna coaxial plugs P-101, P-102 and P-103.

When checking contacts of relays and switches, include the contacts of the six H. V. Interlock Switches, S-201, (Refer to Table 6-1, DAILY, 6, Interlocks).

SECTION 7

CORRECTIVE MAINTENANCE

1. GENERAL.

The corrective maintenance information and procedures given in Section 7 in NAVSHIPS 91690 (A) apply in full to the AN/FRT-15 equipment as modified except in specific cases as covered in this supplement.

2. ADDITIONAL HIGH VOLTAGE PROTECTION.

In Section 7, paragraph 2*c* in NAVSHIPS 91690 (A) modify the description of the interlock circuits by the addition of the following at the end of the first paragraph:

"The H. V. Interlock Switches S-201, added by installation of the RM-194, short the dc side of the high voltage rectifiers to ground when any door is opened or the rectifier protective screen is removed".

In the Trouble Shooting Chart, an additional check on H. V. Interlock Switches is given in Table 7-1A.

3. COMPONENT CHARACTERISTICS.

Figures 7-10A, 7-12A, 7-27A, 7-28A, 7-53A and 7-54A show the locations of the H. V. Interlock Switches, S-201. The connections for these switches are shown in Figures 3-7A, and 7-96A.

The arrangement of the 71 ohm RF output connections is shown in Figure 7-27A, and the schematic Figure 7-95A.

TABLE 7-1A TROUBLE SHOOTING CHART

Trouble	Sympton	Check Point	Additional Checks & Corrections
POWER SUPPLY CIRCUITS			
Plate Voltage not on	With PLATE switch in ON position: 4. PLATE on indicator lights but LOW VOLTAGE and HIGH VOLTAGE meters read O.	4. Check that all cabinet doors are latched closed. Check that thumbscrews on H. V. Rectifier protective screen are tight.	4. Interlock control switches may be open or H. V. interlock switches may be shorted to ground.

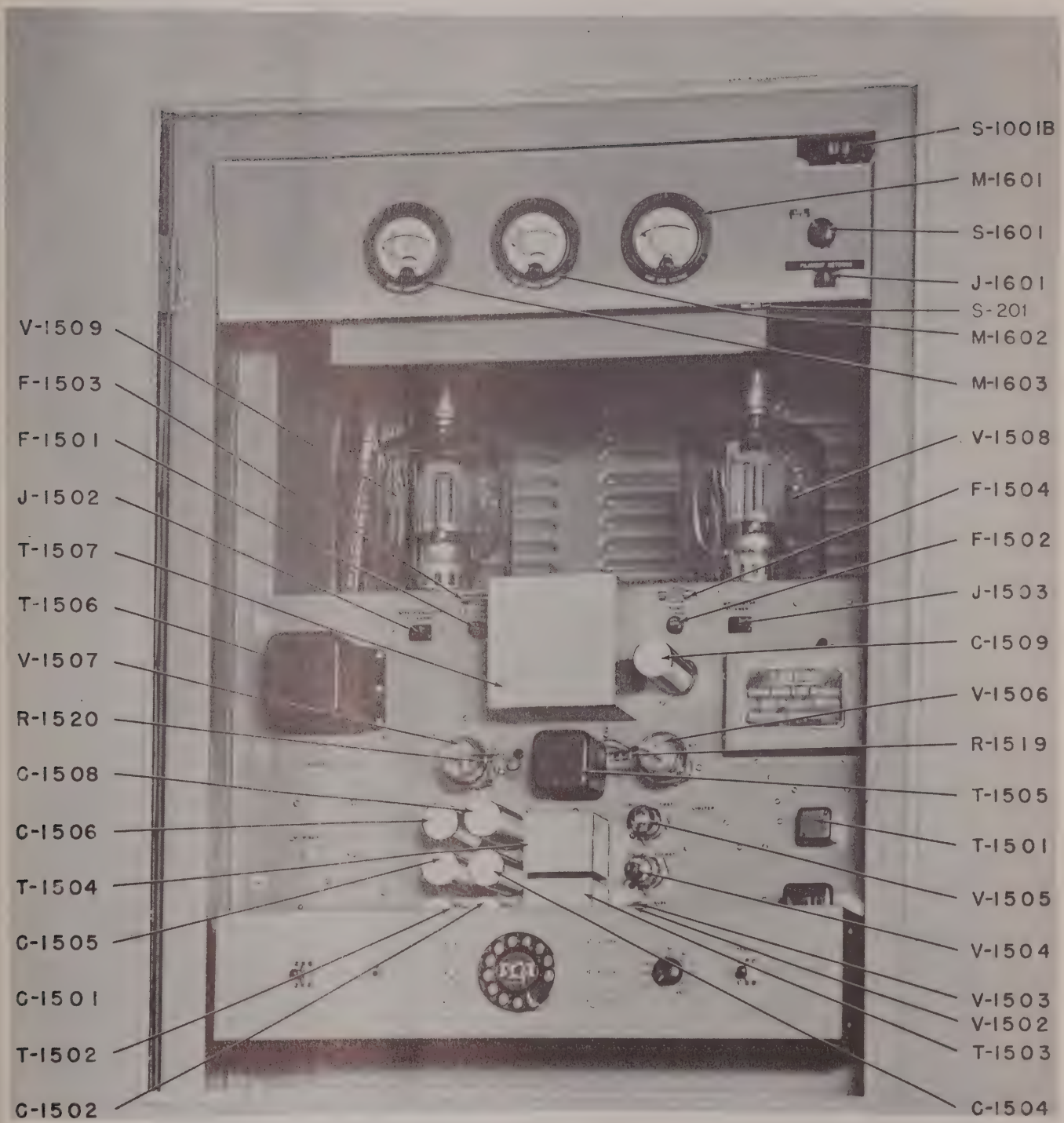


Figure 7-10A. Radio Modulator Group OA-204/FRT-15, Front View, Parts Arrangement

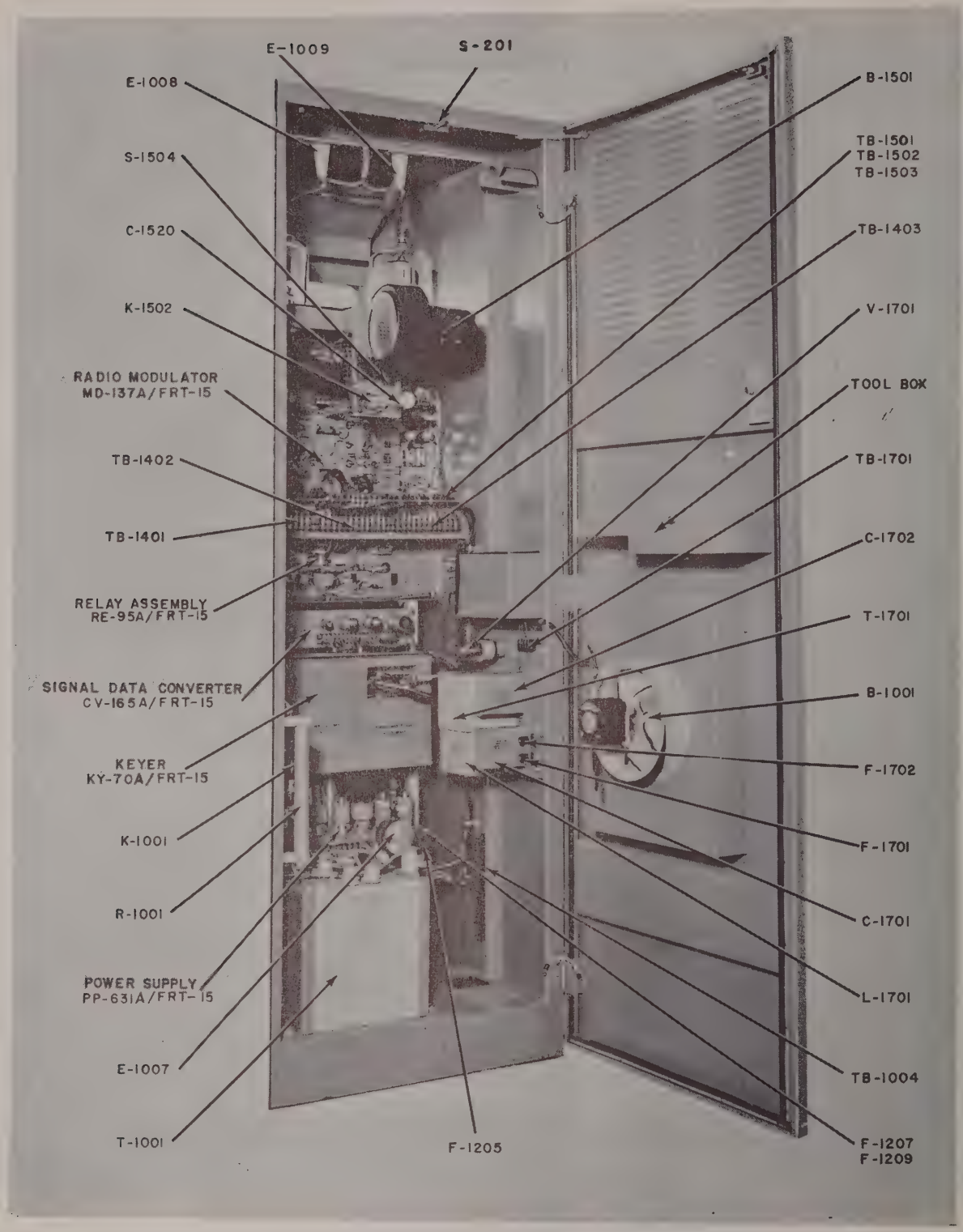


Figure 7-12A. Radio Modulator Group OA-204/FRT-15, Rear View, Parts Arrangement

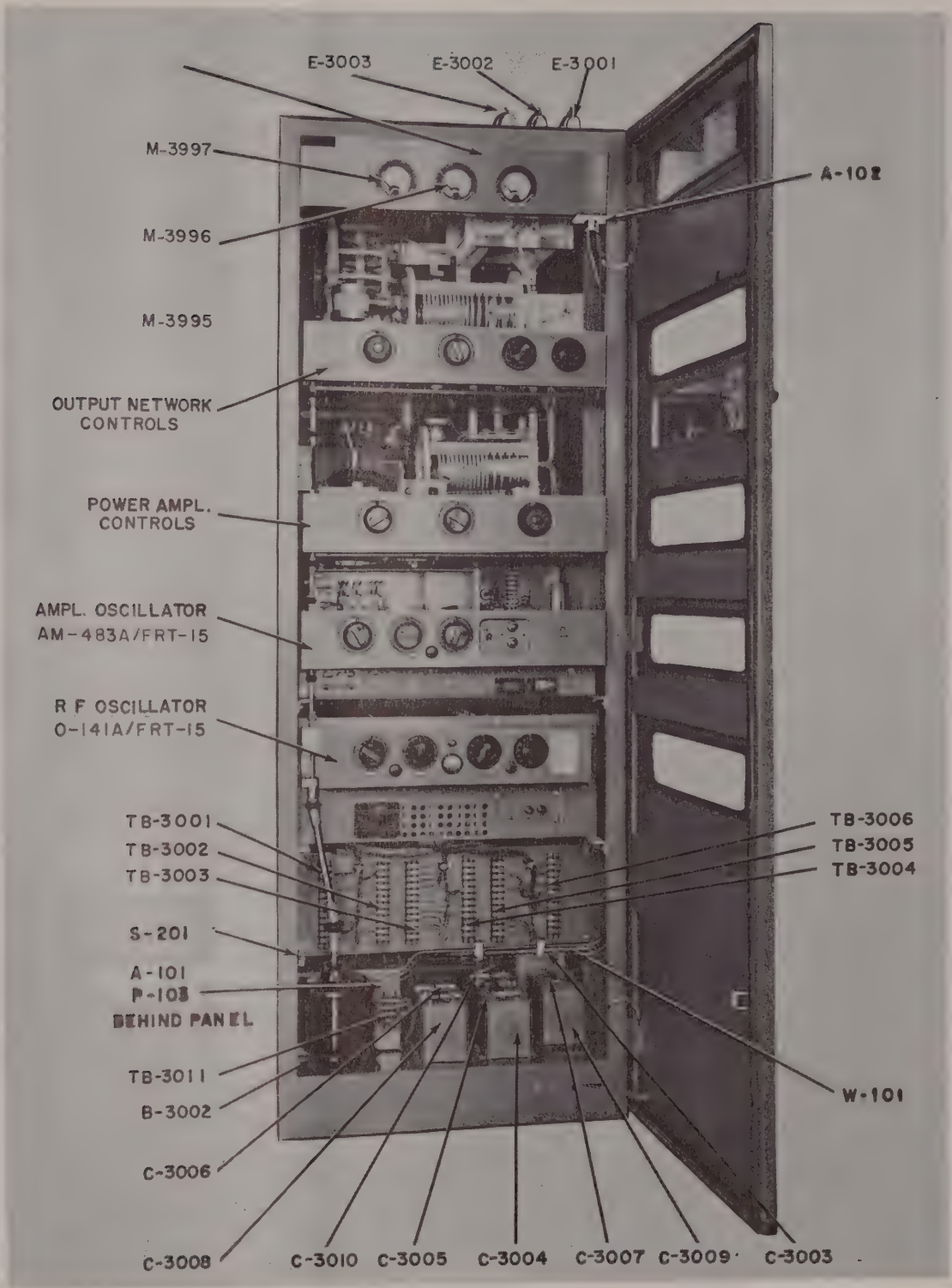


Figure 7-27A. Radio Transmitter Group OA-205/FRT-15, Front View, Door Open

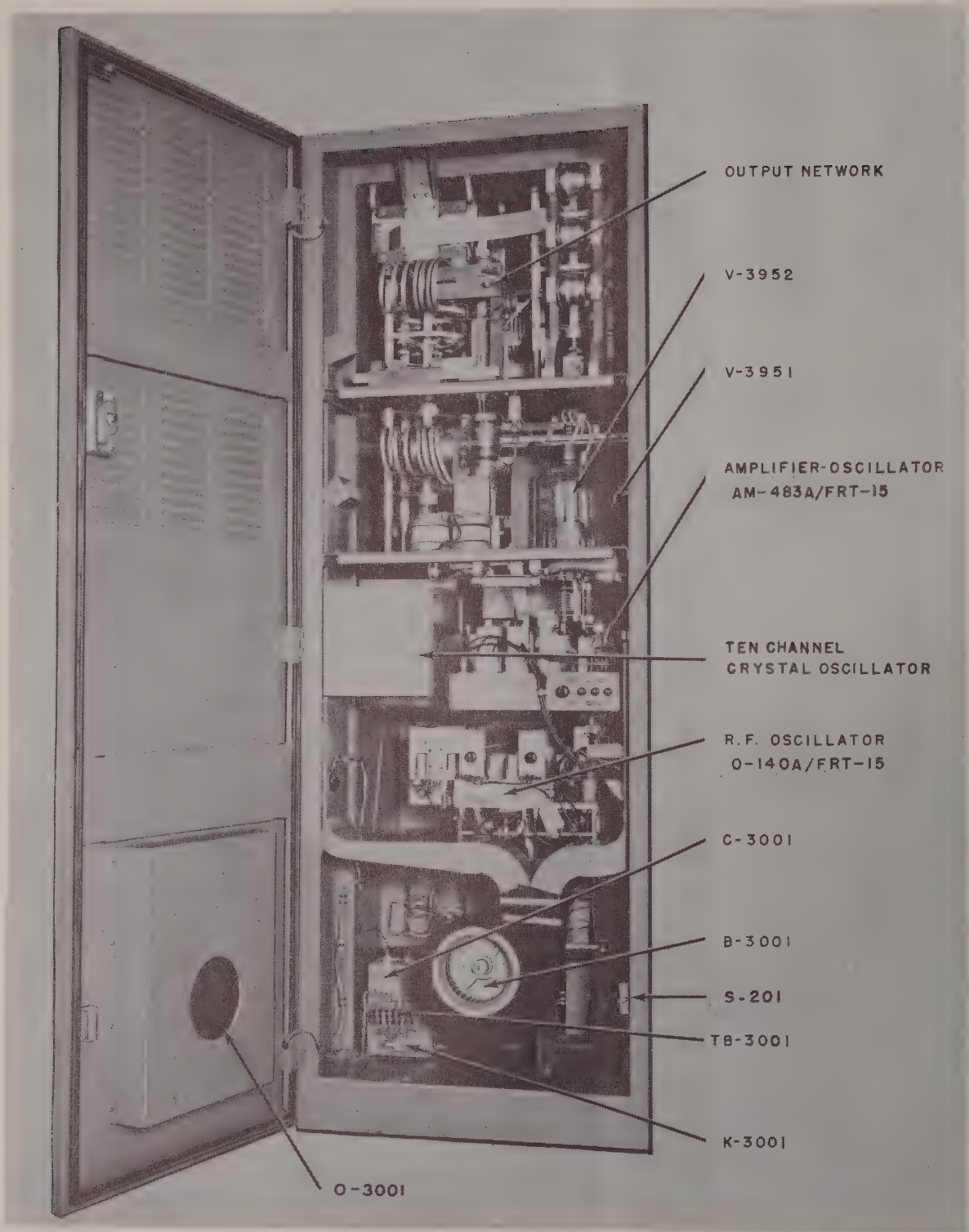


Figure 7-28A. Radio Transmitter Group OA-205/FRT-15, Rear View, Door Open

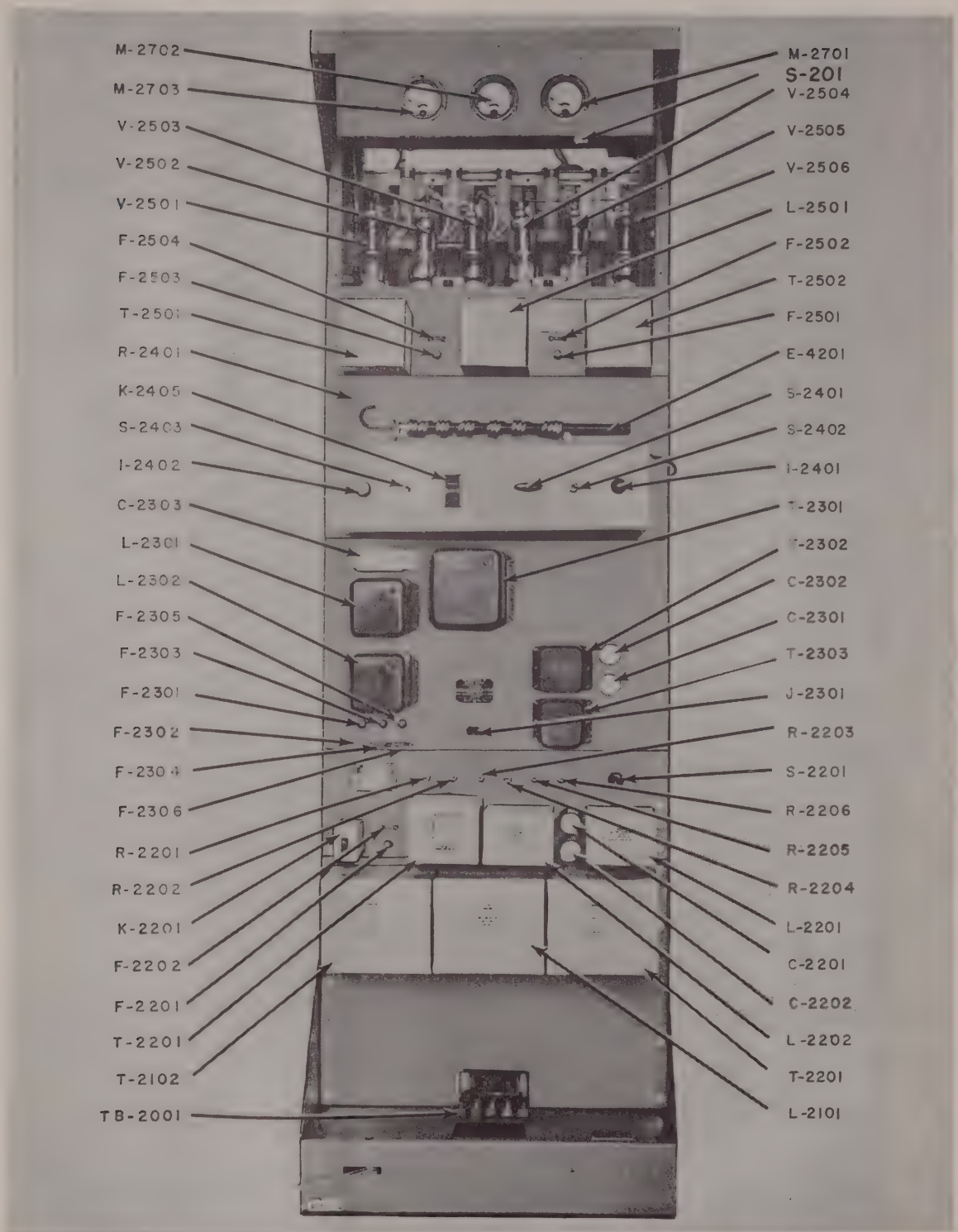


Figure 7-53A. Power Supply Group OA-206/FRT-15, Front View, Door Open

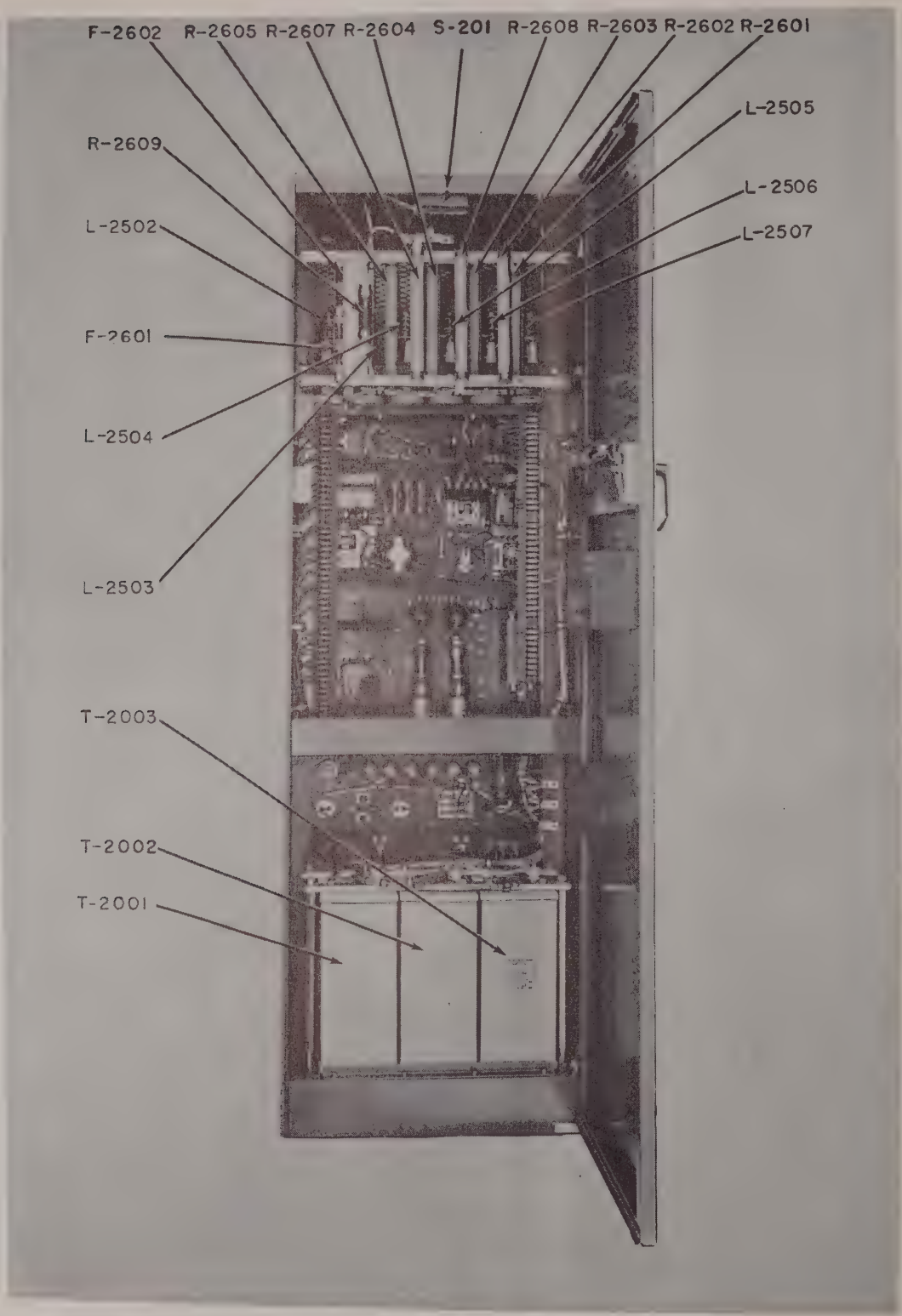
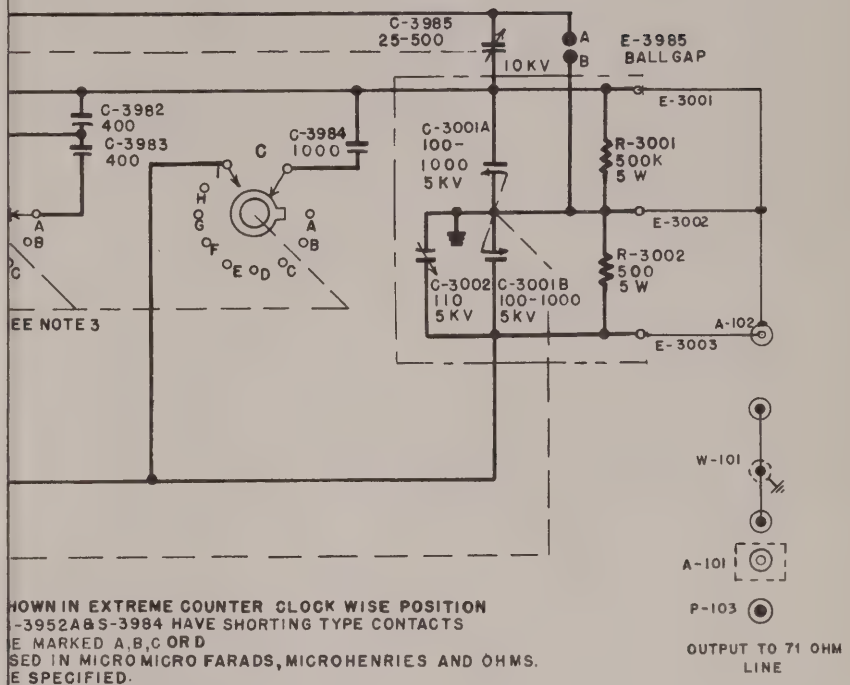


Figure 7-54A. Power Supply Group OA-206/FRT-15, Rear View, Door Open



Radio Frequency Amplifier CY-932/FRT-15,
r and Output Network Schematic

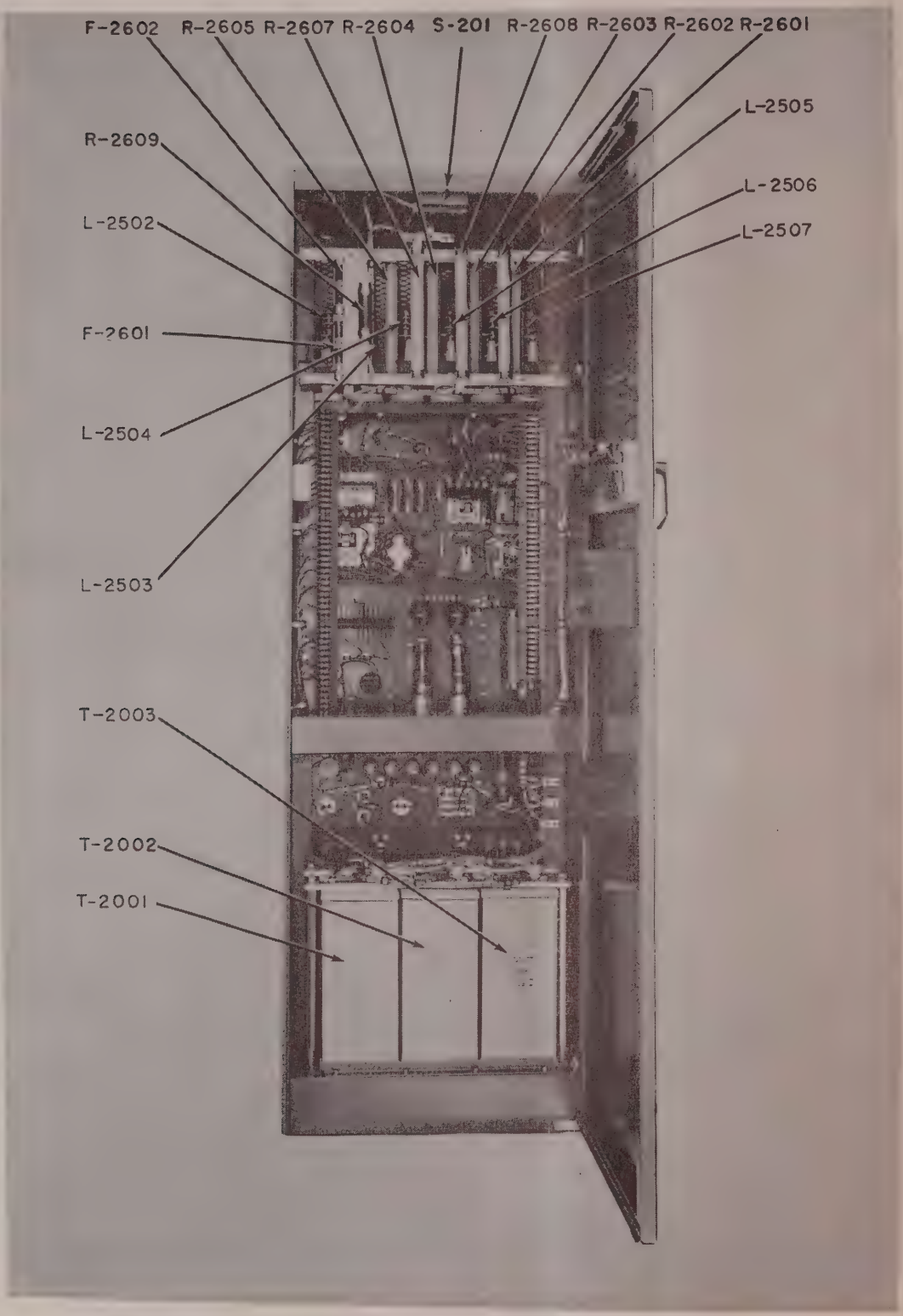


Figure 7-54A. Power Supply Group OA-206/FRT-15, Rear View, Door Open

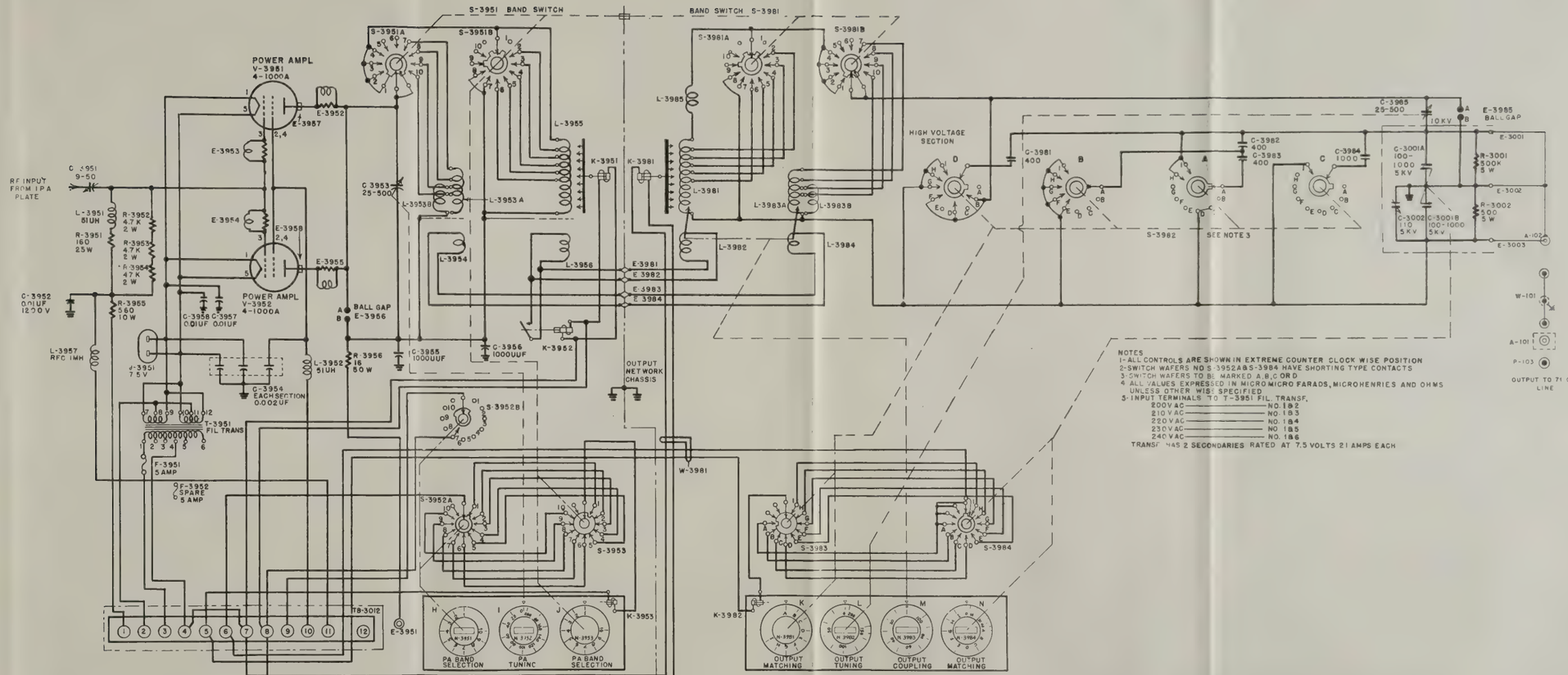
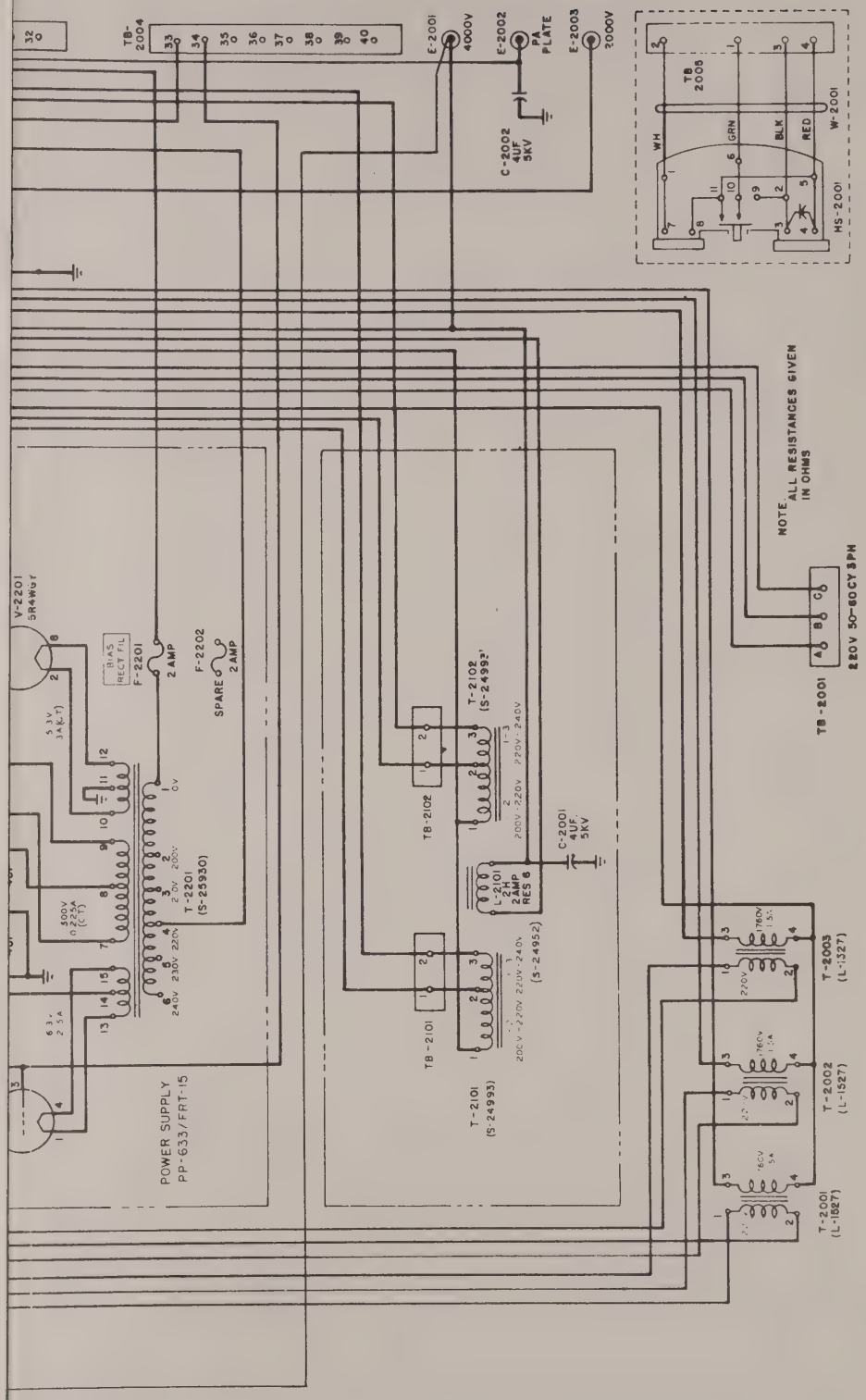

S-3951 BAND SWITCH
BAND SWITCH S-3981
POWER AMPL V-3951 4-1000A
POWER AMPL V-3952 4-1000A
RF INPUT FROM IPA PLATE
BALL GAP E-3956
OUTPUT NETWORK CHASSIS
HIGH VOLTAGE SECTION
SEE NOTE 3
T-3951 FIL TRANS
F-3951 5 AMP
F-3952 SPARE 5 AMP
TB-3012
PA BAND SELECTION
PA TUNING
PA BAND SELECTION
OUTPUT MATCHING
OUTPUT TUNING
OUTPUT COUPLING
OUTPUT MATCHING
OUTPUT TO 71 OHM LINE
NOTES
1-ALL CONTROLS ARE SHOWN IN EXTREME COUNTER CLOCK WISE POSITION
2-SWITCH WAFERS NO S-3952A&S-3984 HAVE SHORTING TYPE CONTACTS
3-SWITCH WAFERS TO BE MARKED A,B,C OR D
4-ALL VALUES EXPRESSED IN MICRO MICRO FARADS, MICROHENRIES AND OHMS UNLESS OTHER WISE SPECIFIED
5-INPUT TERMINALS TO T-3951 FIL. TRANSF.
200 V AC — NO. 182
210 V AC — NO. 183
220 V AC — NO. 184
230 V AC — NO. 185
240 V AC — NO. 186
TRANSF HAS 2 SECONDARIES RATED AT 7.5 VOLTS 21 AMPS EACH

Figure 7-95A. Cabinet-Radio Frequency Amplifier CY-932/FRT-15, Power Amplifier and Output Network Schematic



Supply Group OA-206/FRT-15 Schematic—Wiring Diagram

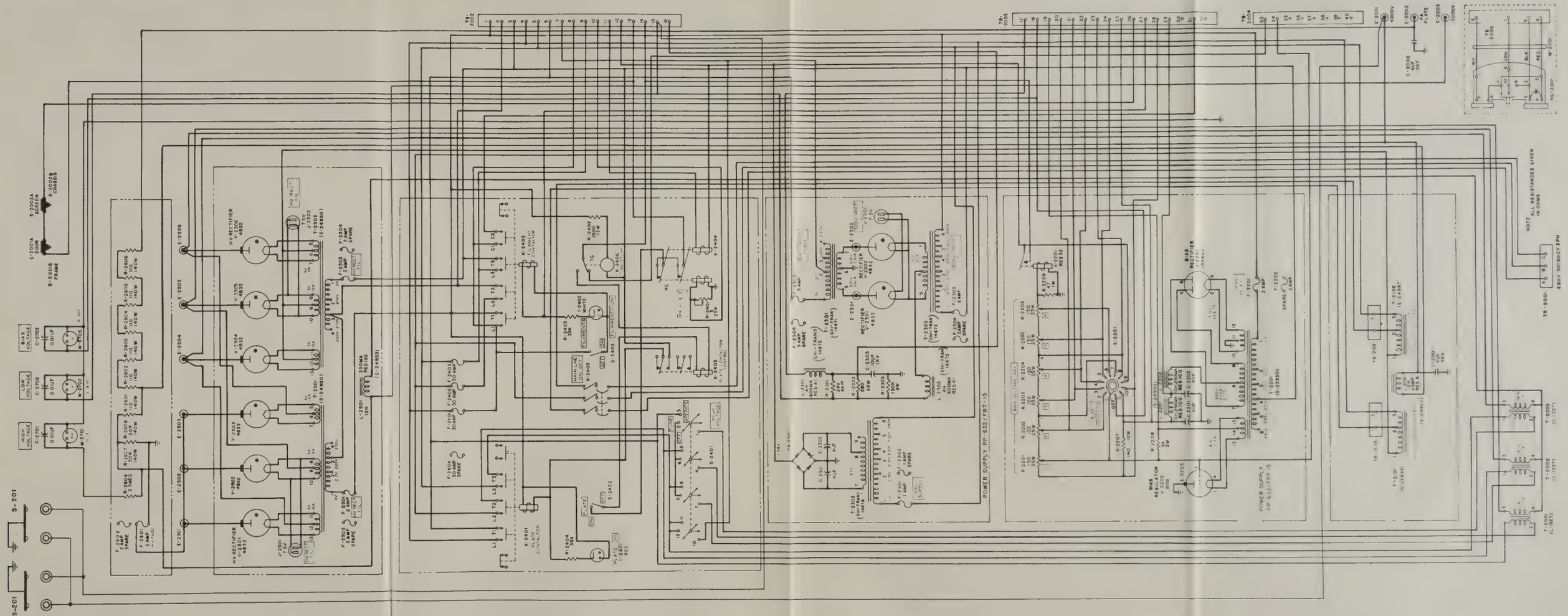


Figure 7-96A. Power Supply Group OA-206/FRT-15 Schematic—Wiring Diagram

SECTION 8

PARTS LISTS

All information in Section 8 of NAVSHIPS 91690 (A) applies in full to the AN/FRT-15 equipment as modified. Material in this section of the supplement is additional to that included in the basic instruction book.

a. Table 8-4A, Table of Replaceable Parts, includes the parts added to the AN/FRT-15 by installation of the RM-193 and RM-194 kits.

b. Table 8-6A, Cross Reference Parts List includes AN numbers and Standard Navy Stock Numbers for the additional parts listed in Table 8-4A.

c. Table 8-8A List of Manufacturers includes one manufacturer additional to those given in Table 8-8.

TABLE 8-4A TABLE OF REPLACEABLE PARTS

Reference Symbol	Standard Navy Stock Number	Name and Description	Locating Function
		LOW IMPEDANCE ANTENNA KIT RM-193	
100 to 199		KIT, LOW IMPEDANCE ANTENNA: coaxial arrangement; 71 ohms nom impedance; solid copper conductor no. 9 AWG; polyethylene dielectric; one single shield, gray vinyl jacket; approx o/a length including termination 7 feet 3 in., approx o/a length excluding termination 7 feet 2 in.; 0.87 in. dia o/a cross section of cable terminal fitting on first end c/o one AN/UG-28 7/U receptacle, one AN/UG-154U plug, one coax cable adapter, Radiomarine dwg A-10579, and one bracket assembly Radiomarine dwg C-40193; terminal fitting on second end c/o one AN/UG-154 U plug, one AN/UG-352A/U receptacle, one coax cable adapter, Radiomarine dwg no. A-10579, one bracket assembly Radiomarine dwg no. C-40194, one tubing ground connection, per Radiomarine dwg KS-3821, and one tubing antenna connection per Radiomarine dwg KS-3822; Radiomarine Corporation of America, New York, N. Y. dwg no. TS-2174, type RM-193.	Field modification kit for operation into 71 ohm coax line.
A-101		BRACKET, RECEPTACLE: steel, o/a dim., 8-3/8 in. lg, 6-3/4 in. w, 3 in. h; mounts by two 5/16 in. dia holes spaced 4-1/2 in. apart on 1-1/2 in. by 1/2 in. centers; includes one insulator, dwg no. KS-3823; one receptacle American Phenolic no. AN/UG-287/U; Radiomarine dwg C-40193.	Lower mtg bracket connection.
A-101A		INSULATOR, PLATE: natural "XXX" paper base laminated phenolic, type LTS-E-4 per JAN-P-13; glazed finished; o/a dim., Ref Dwg Group 9, item no. 197, 4 in. lg, 4 in. w, 1/4 in. thk; Radiomarine dwg KS-3823.	P/o A-101.
A-101B	N17-C-67731-5697	CONNECTOR, RECEPTACLE, ELECTRICAL: coaxial AN/UG-287/U.	P/o A-101.
A-102		BRACKET, RECEPTACLE: steel, o/a dim., 4-7/8 in. lg, 4-1/4 in. w, 3-7/8 in. h; mounts by three 1/4 in. dia holes spaced 1 in. apart on 11/16 in. centers; includes one insulator; dwg no. KS-3823, one receptacle American Phenolic no. AN/UG-352 A/U Radiomarine dwg C-40424.	Upper mtg bracket.
A-102A		Same as A-101A.	P/o A-102.
A-102B	N17-C-73115-8789	CONNECTOR, RECEPTACLE, ELECTRICAL: coaxial AN/UG-352 A/U.	P/o A-102.
E-101		CONTACT, ELECTRICAL: silver pl copper tubing, 1/2 in. lg, 3/16 in. dia; slipped on and solder to inner conductor of coax cable; Radiomarine dwg A-10579.	Adapter for W-101.
E-102		Same as E-101.	Adapter for W-101.
E-103		CONTACT, ELECTRICAL: fixed connector; 3/8 in. od silver pl copper tubing; approx o/a dim., 9-3/8 in. lg, 5-3/8 in. w, 3 in. h; mounts by 3 holes, two of which are 3/8 in. dia spaced 4-3/8 in. apart, the other is 17/64 in. dia spaced 4-1/2 in. apart; Radiomarine dwg KS-3821.	Ground connector.

TABLE 8-4A TABLE OF REPLACEABLE PARTS (Cont'd)

Reference Symbol	Standard Navy Stock Number	Name and Description	Locating Function
LOW IMPEDANCE ANTENNA KIT RM-193			
E-104		CONTACT, ELECTRICAL: fixed connector; 3/8 in. od silver pl copper tubing; approx o/a dim., 4-1/2 in. lg, 2-3/4 in. w; mounts by one hole 3/8 in. dia; Radiomarine dwg KS-3822.	Antenna connector.
E-105 (2 ea)		CLAMP, ELECTRICAL: 24 S-T alclad; plain finish, one bolt type fastening device; approx o/a dim., 1-5/8 in. lg 7/8 in. dia., 5/8 in. w; designed to hold material 7/8 in. max dia; Tinnerman Products Inc, Cleveland, Ohio Part no. C3044-7.	W-101 Clamp.
E-106		Same as E-101.	Adapter for P-103.
O-101		COUPLING, TUBE: brass; machined; style no. 1, sect S, MBCA Ref Dwg Group 43 (Revised); dim. section S, MBCA Ref Dwg Group 43 (Revised) 1-3/16 in. o/a lgth, 1/2 in. dia; one end to accommodate 3/16 in. tubing includes two 6/32 set screws spaced 90 deg apart 3/16 in. from end, the opposite end accommodates 3/8 in. dia tubing; Radiomarine dwg KS-3824.	E-104 Adapter.
P-101	N17-C-71422-3137	CONNECTOR, PLUG, ELECTRICAL: one contact, female straight shape; o/a dim. excluding protruding contacts and terminals, 3 in. lg 1-1/2 in. dia; resistance to corrosion, precious metal pl, locking type, 1-1/4 -18 internal thd coupling nut; 0.87 in. max dia cable accommodated; weatherproof; Amphenol type AN/UG-154/U.	P/o W-101.
P-102		Same as P-101.	P/o W-101.
P-103		Same as P-101.	R. F. Output cable connection.
W-101		LINE, RADIO FREQUENCY TRANSMISSION: coaxial type; 71 ohms characteristic impedance, 16 mmf capacitance per ft; 10,000 v root mean sq max operating voltage; coaxial type line, single inner conductor no. 9 AWG, copper, outer conductor, 0.870 in. od, copper, polyethylene insulation, 0.680 in. od; 7 feet 2 in. o/a length of transmission line; terminated w/connector ea end, American Phenolic, type no. AN/UG-154/U; Radiomarine dwg B-31189.	71 Ohm coaxial line.
W-101A		CABLE, RADIO FREQUENCY: coaxial; 71 ohms nominal impedance, 16 mmfd capacitance per ft, 10,000 v rms max operating voltage; one inner conductor, solid, copper, no. 9 AWG; polyethylene dielectric; outer conductor, braid, copper vinyl jacket; 0.870 in. dia o/a; American Phenolic no. 21-125.	P/o W-101.

TABLE 8-4A TABLE OF REPLACEABLE PARTS (Cont'd)

Reference Symbol	Standard Navy Stock Number	Name and Description	Locating Function
		H.V. INTERLOCK SWITCH KIT RM-194	
200 to 299		SWITCH KIT, INTERLOCK: door actuated plunger type; breaks 4000 vdc circuits; mtg requires drilling of holes in transmitter cabinet; interrupts power to high voltage rectifiers, then shorts dc side of rectifiers to ground; includes all necessary cable and hardware for complete installtaion to transmitter, 6 switches Radiomarine dwg TS-2166; data regarding "the mfr" Radiomarine Corporation of America, Radiomarine type no. RM-194, per dwg D-50196 u/w but not p/o AN Radio Transmitter Set AN/FRT-15A.	HV shorting modification kit.
E-201		CONTACT, ELECTRICAL: p/o switch, one point, ductile elkonite, approx dim., 1/4 in. dia, 0.118 in. lg, o/a dim., 1-3/8 in. lg, 13/16 in. w, 3/16 in. thk; 4000 volts; Radiomarine dwg KS-3790.	Electrical contact plate for HV interlock switch.
E-202		CONTACT, ELECTRICAL: p/o switch, 2 points, ductile elkonite, approx dim., 1/4 in. dia, 0.118 in. lg, o/a dim. 2-1/2 in. lg, 3/4 in. w; 0.118 in. thk; 4000 volts; Radiomarine dwg no. KS-3791.	Electrical contact plate for HV interlock switch.
E-203	N17-I-70267-9391	INSULATOR, STANDOFF: ceramic JAN type no. NS3W-1212.	HV contact support.
E-204		Same as E-203.	HV contact support.
E-205	N17-C-781117-351	CLAMP, ELECTRICAL: 0.017 in. aluminum; zinc chromate finish; on bolt type fastening device; o/a dim., 55/64 in. lg, 5/8 in. w, 0.409 in. h; one 11/64 in. dia mtg hole; designed to hold material 5/16 in. dia; 1/32 in. thk extruded neoprene cushion; data regarding "the mfr" Tinnerman Products, Inc Cleveland, Ohio type no. 3044-2.	Clamp for W-212.
E-206		Same as E-205.	Clamp for W-202.
E-207		Same as E-205.	Clamp for W-211.
O-201		SPRING (1), HELICAL, COMPRESSION: music wire, conforming to Navy Spec 23W11C; round material; 0.031 in. dia material; 2-1/2 in. free o/a lg of spring; od of spring not specified, 25/64 in. id; Radiomarine dwg KS-3714.	HV shorting spring.
O-202		SCREW, MACHINE: stainless steel, conforming to class 7, type A, of MIL-5-852; flat fillister, Section A, MBCA Ref Dwg Group 29, slot, Section B, MBCA Ref Dwg Group 29, dim., Section A, MBCA Ref Dwg Group 29. A-3/16 in., H-7/64 in., L-7/16 in.; thread data 0.112 in. od, 40 thd per in., 1/4 in. lgth; Radiomarine dwg KS-3715.	Guide screw.

TABLE 8-4A TABLE OF REPLACEABLE PARTS (Cont'd)

Reference Symbol	Standard Navy Stock Number	Name and Description	Locating Function
		H.V. INTERLOCK SWITCH KIT RM-194	
S-201	3360-072452030	SWITCH, INTERLOCK: door actuated plunger type; electrical data, current not rated, breaks 4000 vdc circuit; contact data, doublepole, single-throw, rounded tip type (male), silver cadmium alloy oxide; aluminum frame; o/a dim., 7 in. lg, 4-5/8 in. w, 2-5/8 in. h; termination data, 2 term (1 per contact plate), one no. 25 drill hole for 6-32 thd machine screw, located on switch contact plate; mtg data, three no. 16 drill and slotted holes on isosceles triangular mounting center spaced 2-5/8 in. apart on base with third hole 3/4 in. below base line; data regarding "the mfr", Radiomarine Corporation of America, Radiomarine dwg TS-2166; interrupts power to high voltage rectifiers, then shorts dc side of rectifiers to ground; p/o AN Radio Transmitting Set AN/FRT-15.	H.V. interlock.
W-201		CABLE ASSEMBLY, POWER, ELECTRICAL: Boston Insulator Wire & Cable Co type PFGV-15000-16, similar to type I, grade A, class 1, 7 mm per MIL-C-3162, single conductor, stranded, no. 21 AWG, teflon insulated, white glass fiber cover w/red tracer; 6 feet 7-1/2 in. lg o/a; one, Zierick Manufacturing Corp, terminal, part no. 234 terminal fitting on first end; one, Zierick Manufacturing Corp, terminal part no. 234, terminal fitting on second end; Radiomarine dwg B-31175-3.	Inter-connection cable Radio Transmitter Group.
W-202		CABLE ASSEMBLY, POWER, ELECTRICAL: Radiomarine dwg B-31175-4 (Same as W-201, except for over-all lg 3 ft, 8 in. is used).	Inter-connection cable Radio Modulator Group.
W-203		CABLE ASSEMBLY, POWER, ELECTRICAL: Radiomarine dwg B-31175-6 (Same as W-201, except for over-all lg, 2 ft. 10 in. is used).	Inter-connection cable Power Supply Group.
W-204		CABLE ASSEMBLY, POWER, ELECTRICAL: Radiomarine dwg B-31175-8 (Same as W-201, except for over-all lg, 5 ft, 3-1/2 in. is used).	Inter-connection cable Radio Transmitter Group.
W-205		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: single conductor; stranded; no. 16 AWG; nylon jacket covering; AN, JAN type SRIR-2-1/2 (26)-16-U-2; approx 5 ft 2-3/8 in. lg over-all, 5 ft 1-5/8 in. lg excluding terminations 0.166 in. dia over-all cross section of cable; one Patton-Mac Guyer, terminal no. RM-2-8 terminal fitting on first end; one, Patton-MacGuyer terminal no. RM-2-8 terminal fitting on second end; Radiomarine dwg B-31176-1.	Inter-connection cable Radio Modulator Group.
W-206		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: Radiomarine dwg B-31176-2 (Same as W-205, except for over-all lg, 6 ft 3-1/8 in. is used).	Inter-connection cable Radio Modulator Group.

TABLE 8-4A TABLE OF REPLACEABLE PARTS (Cont'd)

Reference Symbol	Standard Navy Stock Number	Name and Description	Locating Function
		H.V. INTERLOCK SWITCH KIT RM-194	
W-207		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: single conductor; stranded, no. 16 AWG, nylon jacket covering; AN, JAN type SRIR-2-1/2 (26)-16-U-2; approx 8 ft 2 in. lg over-all, 8 ft 1-1/4 in. lg excluding termination, 0.166 in. dia over-all cross section of cable; conductor on first end extends 1/2 in. beyond jacket, wire tinned; one Patton-MacGuyer terminal, no. RM-2-8 terminal fitting on second end; Radiomarine dwg B-31176-5.	Inter-connection cable Radio Transmitter Group.
W-208		CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRIC: single conductor, stranded, no. 16 AWG, nylon jacket covering; AN JAN type SRIR-2-1/2(26)-16-U-2, approx 4 ft 10 in. lg over-all, 4 ft 9-1/4 in. lg excluding termination, 0.166 in. dia over-all cross section of cable; one Zierick Mfg Co part no. 93 terminal fitting on first end; one Patton-MacGuyer, terminal no. RM-2-8 terminal fitting on second end; Radiomarine dwg B-31176-7.	Inter-connection cable Radio Transmitter Group.
W-209		CABLE, POWER, ELECTRICAL: single conductor, no. 21 AWG copper, stranded, 18 strands no. 30 AWG; teflon insulated conductor; white glass fiber cover w/red tracer; round cross section; 1/4 in. dia over-all; Boston Insulator Wire and Cable Co, Boston, Mass; type PFGV-15000-16, similar to type I, grade B, class 1, 7 mm per MIL-C-3162.	HV inter-connection bulk cable for W-201, 202, 203, 204.
W-210		WIRE, ELECTRICAL: strnaded conductor; no. 16 AWG; 26 strands; JAN type SRIR-2-1/2(26)-16-U-2.	Inter-connection bulk wire for W-205, 206, 207, 208.
W-211		WIRING HARNESS: 2 conductors one no. 16 AWG, copper, stranded; one no. 21 AWG, stranded; material of insulation per conductor, red nylon jacket for no. 16 AWG wire, white glass fiber cover with teflon insulation for no. 21 AWG wire; working voltage per conductor, 1000 v and 15000 v; approx 14 in. lg over-all; nylon lacing cord 1 in. apart binding conductors together; 2 terminals located one on each end of no. 16 AWG wire, Zierick Mfg Co terminal no. 234; 2 terminals located one on each end of no. 21 AWG wire, Patton-MacGuyer terminal no. RM-2-10; color-coded conductors; Radiomarine dwg B-31605.	Inter-connection cable Power Supply Group.
W-212		WIRING, HARNESS: 2 conductors, one no. 16 AWG, copper stranded, one no. 21 AWG, copper stranded; material of insulation per conductor, red nylon jacket for no. 16 AWG wire, white glass fiber cover with teflon insulation for no. 21 AWG wire; wirking voltage, 1000 v, and 15,000 v; approx 26 in. lg over-all; nylon lacing cord 1 in. apart binding conductors together; 2 terminals located one on each end of no. 16 AWG wire, Zierick Mfg Co terminal no. 234; 2 terminals located one on each end of no. 21 AWG wire, Patton-MacGuyer terminals no. RM-2-8, color-coded conductors; Radiomarine dwg B-31633.	Inter-connection cable Radio Transmitter Group.

TABLE 8-6A CROSS REFERENCE PARTS LIST

ARMY-NAVY TYPE	KEY SYMBOL	STANDARD NAVY STOCK NUMBER	KEY SYMBOL
UG-154/U	P-101	N17-C-67731-5697	A-101B
UG-287/U	A-101B	N17-C-71422-3137	P-101
UG-352A/U	A-102B	N17-C-73115-8789	A-102B
AIR FORCE STOCK NUMBER	KEY SYMBOL	N17-C-781117-351	E-205
		N17-I-70267-9391	E-203
3360-072452030	S-201		

TABLE 8-8A LIST OF MANUFACTURERS

ABBREVIATION	NAME	ADDRESS
———	Tinnerman Products Inc.	Cleveland, Ohio